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STUDIES IN TUBERCULOSIS.

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THE investigations upon which the following papers are based were instituted on behalf of the National Health and Medical Research Council in January, 1938, and continued during the ensuing three years. The initial object of the work was to supplement, after an interval of nine years, earlier studies on tuberculous infection in human beings attributable to the human and bovine types of *Mycobacterium tuberculosis* respectively; but as the research gathered momentum several interesting collateral lines of inquiry were opened and pursued. The aspects of the many-faceted subject of tuberculosis which have been studied are included in the following titles:

I. "The Efficacy of Cultural Methods in the Diagnosis of Tuberculosis."

II. "The Relative Incidence of Human and Bovine Types of Mycobacterium Tuberculosis in Human Disease."

III. "The Incidence of Symptomless Tuberculous Bacilluria in Subjects of Osseous and Pulmonary Tuberculosis."

IV. "The Importance of Directing Attention to the Content of the Fasting Stomach as a Diagnostic Measure in Tuberculosis."

V. "Biopsy Study of Lymphatic Glands in Relation to Tuberculous Joints."

Reports presenting data collected in the pursuit of these several avenues of inquiry will be prepared as the exigencies of a pressing routine permit.

A major development in the work during the year 1940 was the institution of a bacteriological survey for the purpose of supplementing, if not complementing, the routine radiography of recruits enlisting for service in the Australian Imperial Force. A report embodying the bacteriological findings attendant on cultural methods applied to the sputum or gastric content, or both, of 322 men rejected or deferred by reason of radiological evidence of pulmonary tuberculosis, has already been furnished to the Director-General of Medical Services and is now in the press.

I. THE EFFICACY OF CULTURAL METHODS IN THE DIAGNOSIS OF TUBERCULOSIS.[1]

It is a remarkable fact that although *Mycobacterium tuberculosis* has never defied cultivation and was indeed recovered in culture by Robert Koch in his classic research in 1882, until recent years no extended use has been made of the cultural method in the routine bacteriological diagnosis of tuberculosis. For too long, hospital, sanatorium and public health laboratories have relied on the microscopic search of film preparations to disclose the presence of tubercle bacilli in sputum, with resort to guinea-pig inoculation to reveal them in such specimens as urine and pleural exudates.

Experience gained during the last three years in the cultivation of 370 strains of *Mycobacterium tuberculosis* from 928 diverse samples of pathological tissues and exudates has convinced me of the validity of the claims of those workers who assert that cultural methods are at least as effective as that of guinea-pig inoculation.

Presentation of Results.

The efficacy of direct cultivation cannot be estimated from the fact that in the present study 370 cultures of *Mycobacterium tuberculosis* were obtained from 928 specimens examined. Many of the specimens were sent on clinical suspicion, which frequently was little more than a

[1] A report to the National Health and Medical Research Council of Australia.

bow drawn at a venture. With regard to many which yielded a negative finding, I have been enabled to ascertain that the clinical condition of the patients from whom they were derived proved to be non-tuberculous; but the ultimate diagnosis in many cases remains unknown to me. For the purpose of assessing the value of direct cultivation of *Mycobacterium tuberculosis* I have selected the following groups of specimens as representing tissues the tuberculous nature of which could be verified by post-mortem, histological or exceptionally strong clinical evidence.

Cerebro-Spinal Fluid (100%).

From the cerebro-spinal fluid of every child who died of tuberculous meningitis at the Children's Hospital, Melbourne, during the three years 1938, 1939, 1940, *Mycobacterium tuberculosis* has been cultivated. There have been 57 successful cultivations from the cerebro-spinal fluid of children (from the diagnostic lumbar puncture fluid, from the ventricular fluid secured *post mortem*, or from both) and *Mycobacterium tuberculosis* has been recovered by direct cultivation of the cerebro-spinal fluid of eight adult patients. Laboratory workers who have pored over film preparations of deposits from cerebro-spinal fluid will appreciate the relative barrenness of microscopic search as a method for the bacteriological confirmation of the diagnosis of tuberculous meningitis.

Bronchial Glands (96·1%).

There has been only one failure in a group of 26 specimens of bronchial glands obtained at autopsy. The single failure was occasioned by the appearance of contaminants in the cultures, and in view of the trouble to be anticipated from contaminants when post-mortem tissues are dealt with, the findings in this group are to be regarded as very satisfactory and eloquent of the efficacy of the technique of cultivation employed.

Bones and Joints (90·3%).

Direct cultivation was successful in recovering *Mycobacterium tuberculosis* from 65 of 72 specimens derived from bones and joints in subjects of osseous tuberculosis. In the majority of instances the pathological material represented the contents of a "cold abscess"; in others the specimen submitted was fluid aspirated from a joint under suspicion of being tuberculous, a biopsy fragment of synovial membrane, or granulation tissue such as was obtained in tuberculous mastoiditis in two children.

Cervical Glands (66·6%).

Tubercle bacilli were recovered by direct cultivation from the undoubtedly tuberculous cervical glands of 24 out of 36 patients so affected. In view of the characteristic difficulty presented by tuberculous glands of the neck in the demonstration of viable tubercle bacilli, the figure of 66·6% for successful recoveries is to be regarded as satisfactory, especially when it is considered that in the 12 instances in which cultivation failed guinea-pig inoculation was also unsuccessful.

Of the 12 specimens derived from clinically tuberculous cervical glands in which bacteriological examination was unsuccessful, six permitted of microscopic section and displayed typical tuberculous histological changes. The six others were examples of caseous detritus offering no opportunity for histological confirmation of the diagnosis; but in three of them acid-fast bacilli were demonstrable in Ziehl-Neelsen preparations. Despite the presence of such acid-fast bacilli, both cultural and animal inoculation methods failed to recover them.

In a former investigation, directed particularly towards the identification of bovine strains as they occurred in the tuberculosis of childhood, I examined specimens of morbid material from a group of 40 children regarded clinically as subjects of tuberculous cervical adenitis. In 24 instances inoculation of guinea-pigs was successful, and *Mycobacterium tuberculosis* was recovered and identified as to type. From the remaining 16 specimens the attempt to communicate tuberculosis to guinea-pigs failed, despite the fact that in five of them acid-fast bacilli were to be seen in direct smears from the softened contents of the glands.

W. J. Penfold[1] has recorded a similar experience. In the investigation of 12 specimens of cervical glandular tissue, removed operatively as clinically tuberculous, he found that no less than nine failed to yield tubercle bacilli on animal inoculation, and noted that in three of the nine non-infective specimens acid-fast bacilli were demonstrable.

All workers in the laboratory diagnosis of tuberculosis must have met the situation in which acid-fast bacilli, known to be present in clinically tuberculous material, are neither amenable to cultivation nor capable of initiating a tuberculous lesion in the guinea-pig. Many such observations are on record; but for wide experience one turns naturally to A. Stanley Griffith.[2] This high authority records that of 179 tuberculous cervical glands examined bacteriologically, 171 by himself and eight by Cobbett, 133 yielded cultures of tubercle bacilli, either directly or from lesions induced in guinea-pigs. The remaining 46 were noted by Griffith as containing no living tubercle bacilli in the original material.

If the particular liability of tuberculous cervical and mesenteric glands to yield "bacteriological blanks" was observed only on attempted cultivation, the feature might reasonably be connected with the fact that these tissues are especially prone to infection with the less easily cultivated bovine type of *Mycobacterium tuberculosis*. Such an explanation is hardly tenable, however, in view of the fact that results attending guinea-pig inoculation, a procedure which should place the bovine bacillus at an advantage, are no better. The phenomenon under discussion, particularly exasperating when acid-fast bacilli are evident on direct microscopic examination, is not limited to tuberculosis of the cervical and mesenteric glands. A. S. Griffith,[3] in investigating a series of 147 cases of bone and joint tuberculosis, noted that the material from 13 patients, all clinically tuberculous, failed to infect guinea-pigs, although in two of the specimens acid-fast bacilli were demonstrated in smears. Many similar observations are on record; the possibility that the acid-fast bacilli have been other than mammalian tubercle bacilli has been fully explored, with accumulation of evidence that such bacilli are properly to be regarded as tubercle bacilli which are dead.

Having been led into a somewhat lengthy digression in the endeavour to show that the proportion (66·6%) of successful direct cultivations of *Mycobacterium tuberculosis* from tuberculous cervical glands is not unsatisfactory and indeed better than was obtained by guinea-pig inoculation with the same type of material in a former investigation (60%), I may perhaps return by tabulating the details regarding the four determinate groups of specimens (Table I).

TABLE I.

Results Attending Direct Cultivation of Mycobacterium tuberculosis.

Nature of Material.	Number of Specimens.	Positive Results.	Percentage of Positive Results.
Cerebro-spinal fluid ..	65	65	100·0
Bronchial glands ..	26	25	96·1
Bones and joints	72	65	90·3
Cervical glands	36	24	66·6
Totals	199	179	89·9

In addition to 179 successful cultivations assembled in the above table, *Mycobacterium tuberculosis* has been cultivated from many sources, the number and variety of which are indicated in Table II.

In all except six instances, in which the tissues of an inoculated guinea-pig were utilized, *Mycobacterium tuberculosis* was cultivated directly from the morbid material submitted.

The low figure for cultures obtained from sputum is to be attributed to the fact that during the first two years

TABLE II.

Derivation of Cultures of Mycobacterium tuberculosis.

Nature of Specimen.	Number of Cultures.
Urine	134
Gastric content of children	16
Pleural exudate	14
Lymphatic glands in relation to tuberculous joints	8
Sputum	8
Lymphatic glands in relation to cutaneous tuberculosis	3
Mesenteric glands	2
Tuberculous epididymis	2
Miscellaneous	4
Total	191

I was interested primarily in pathological material derived from extrapulmonary sources. It was not considered that a search for bovine strains in sputum would be very profitable, although the possibility of implicating the bovine bacillus in pulmonary tuberculosis of human beings is not to be ignored. The publications of Munro[4] (Scotland), Cumming[4] (north of England), Jensen[4] (Denmark), Ruys[5] (Holland) and Lange[4] (Germany) are indicative of the increasing amount of attention being directed to "bovine phthisis", particularly as it occurs among occupational contacts of cattle. In the third year of the research intensive cultural work for the detection of *Mycobacterium tuberculosis* in sputum and gastric content was undertaken concurrently with the radiological examination of recruits; this phase of the investigation is not represented in Table II and the figures relating to it are not included in the total of 928 specimens, from which, as has already been stated, 370 cultures of *Mycobacterium tuberculosis* were obtained.

Technique.

It is perhaps natural that each of the advocates of intensive cultivation of tubercle bacilli as a routine laboratory measure should hold a brief for the culture medium which he has originated or for the technique in which he and his staff have become proficient. Thus Shrewsbury and Barson[6] have reported 100% successful cultivations of *Mycobacterium tuberculosis* from a large number of diverse samples of morbid material known to contain acid-fast bacilli and embracing sputum, cerebro-spinal fluid, urine, fæces and pus. The workers named employed the media of Löwenstein, Petroff and Petragnani, and expressed a preference for that of Löwenstein; they relied upon treatment with 4% caustic soda solution as a means of sterilizing the inoculum of contaminants.

Sweany and Evanoff[7] claim 90% to 100% success in more than 1,000 cultures for *Mycobacterium tuberculosis* undertaken in routine and special work, and affirm that if tubercle bacilli are possessed of sufficient vitality to induce a lesion in a guinea-pig, they are susceptible of direct cultivation. In maintaining this position, Sweany and Evanoff make common cause with H. J. Corper,[8] who has calculated as 100,000 per cubic centimetre, the number of tubercle bacilli requisite for their detection by the microscopic search of films, whereas they are amenable to direct cultivation or recovery through an intermediary guinea-pig in numbers as low as 10 to 100 per cubic centimetre. Sweany and Evanoff commend highly their "cream" and "milk" media and have adopted 3% hydrochloric acid as an agent which can be relied upon to destroy accompanying microorganisms while not impairing the viability of *Mycobacterium tuberculosis*.

Corper and Uyei[9] have published detailed comparative investigations of the utility of a variety of culture media and decontaminating agents. They advocate a technique based on treatment of the material under investigation with 6% sulphuric acid solution and subsequent sowing on their crystal-violet potato cylinder medium, stating that this technique is equal, if not superior, to guinea-pig inoculation.

As regards 4% caustic soda solution and 6% sulphuric acid solution as reagents for the elimination of contaminants, I have found that there is scope for both. In the preparation of cultures from tissues, such as granulation tissue, tonsils and non-caseating lymphatic glands, as also in the treatment of hard, lumpy, caseous matter, I prefer 4% caustic soda solution as having a softening and digestive effect such as is not exerted by 6% sulphuric acid solution. After neutralization and centrifugation, tissues and lumpy caseous matter that have been subjected to the action of 4% caustic soda solution yield a soft pultaceous deposit which can be readily rubbed into the surface of the culture medium. In the Children's Hospital laboratory 6% sulphuric acid solution is the routine agent for the preliminary treatment of all specimens which do not seem to require some degree of softening. The established procedure, which has given results so satisfactory that guinea-pigs are almost entirely supplanted, may be briefly stated as follows:

1. To a convenient volume (one to three cubic centimetres) of sputum or other morbid material add an equal volume of 6% (by weight) sulphuric acid solution in a suitably shaped screw-capped or rubber-stoppered bottle. The 6% sulphuric acid solution is prepared by adding 17 cubic centimetres of sulphuric acid (specific gravity 1·84) to an excess of distilled water and adjusting the final volume with more distilled water to 500 cubic centimetres. By volume, therefore, the sulphuric acid is present in a concentration of 3·4%.

2. Shake vigorously until the resulting mixture is quite homogeneous.

3. Place in the incubator (37·5° C.) for thirty minutes, and give the mixture several further agitations during this period.

4. Neutralize with a normal solution of soda and transfer to sterile stoppered centrifuge tubes.

5. Centrifuge for twenty-five to thirty minutes at 3,000 revolutions per minute.

6. Draw off the supernatant fluid in a pipette and transfer the deposits to not less than three culture tubes, inoculating heavily and rubbing the inoculum well into the medium.

7. Plug the tubes with cotton wool for the first twenty-four to forty-eight hours' incubation, after which replace the cotton wool plugs with sterilized well-fitting corks or rubber stoppers.

Too much emphasis cannot be laid on the necessity for thorough mixing of the material to be investigated with the acid (or alkali). In view of the fact that acid-fast bacilli abound in tap-water and in old samples of distilled water, it is supremely important that the acid and alkali reagents should be prepared with freshly distilled water.

The foregoing routine is, of course, unnecessary when "clean" specimens are to be dealt with, such as the freshly aspirated contents of a cold abscess or cerebro-spinal fluid withdrawn by diagnostic lumbar puncture. The former may be transferred directly to suitable culture media, as may the deposit obtained by aseptic centrifuging of the latter.

Success in the cultivation of *Mycobacterium tuberculosis* is undoubtedly promoted by the implantation of the prepared deposit from every specimen on three or four different culture media. A hospital laboratory with limited accommodation and technical assistance, and a generally urgent daily routine, is at an obvious disadvantage in this respect, and the results which I have brought forward have been obtained with very modest equipment in the matter of culture media. Mr. H. Weir has met very heavy demands for the Petragnani medium, prepared as modified by S. Russell Jamieson,[10] and to the medium of Petragnani, supplemented by the simple non-glycerinated Dorset egg medium, are to be credited the results summarized in Tables I and II. The part assigned to the Dorset egg medium, one of the simplest but none the less a valuable medium for the cultivation of *Mycobacterium tuberculosis*, has been to provide primary cultures of the bovine type. The bovine bacillus, always a capricious microorganism, "uncertain, coy, and hard to please", failed very frequently in primary culture on the Petragnani medium, even though glycerin was excluded. It seems very probable that the dyes incorporated in

media such as those of Petroff, Petragnani and Löwenstein, present an obstacle to the easily discouraged bovine bacillus; but I have not made the point the subject of precise experiment.

In the absence of a variety of culture media, it is of fundamental importance to make multiple sowings on a single reliable medium. The minimum number of tubes requisitioned for any individual specimen in the Children's Hospital laboratory is three; but this is frequently raised to six, especially if the dysgonic bovine bacillus is in question. From material in which the initial numbers of *Mycobacterium tuberculosis* have been small, it has been a recurring experience to obtain a few colonies on one tube, perhaps one on the second, and none on the third. Norton, Thomas and Broom,[11] in urging the necessity for multiple sowings, advise four tubes, and adduce records which show that in 20% of the specimens examined only one tube of the four yielded a growth of *Mycobacterium tuberculosis*.

The Necessity for Routine Cultivation.

The serious limitations of film preparations for the detection of tubercle bacilli are nowhere more apparent than in the field in which most reliance has been placed upon them—namely, in the laboratory examination of specimens of sputum under suspicion as tuberculous. Shrewsbury and Barson,[9] of the University of Birmingham, showed that of 135 samples of sputum, in which tubercle bacilli could not be demonstrated by the microscopic search of Ziehl-Neelsen preparations, 29 (21·4%) were proved tuberculous by cultural examination. Similar findings have been recorded by C. A. Green,[12] from the bacteriological department of the University of Edinburgh. Green reported that in the examination of 2,796 specimens of sputum for the presence of *Mycobacterium tuberculosis*, the positive findings by cultivation exceeded those attending the microscopic search of films by nearly one-third (32·4%). More striking, perhaps, in this particular, are the figures of H. J. Corper and M. L. Cohn,[13] who have published results of a routine cultural examination of what they describe as "microscopic negative sputums". (Their undoubtedly impressive findings can scarcely be permitted to compensate for the aggravated journalese embodied in the term "microscopic negative sputums".) Of 100 samples of sputum with which negative results were consistently obtained at regular monthly examinations of film preparations over periods ranging from four months to two years, one half yielded a positive finding by a single cultural test. Corper and Cohn further state that when several delicate culture methods were used and the studies were made by two groups of workers, the figure of 50% was raised to 71%.

Further evidence of the inadequacy of the film method is provided by my own results in bacteriological examinations undertaken as supplementary to the radiological survey of the Australian Imperial Force. A report on this work has been furnished to the Director-General of Medical Services, who has arranged for its publication; but it is permissible to state that of the first 100 men in whom bacteriological confirmation of the X-ray diagnosis of pulmonary tuberculosis was supplied, the positive results were obtained in the following manner:

By direct smear examination of sputum	32
By culture from sputum in which tubercle bacilli could not be detected by microscopic search ..	46
By culture from the gastric mucus of men from whom no sputum was obtainable	22
	100

Thus by the application of cultural methods and the utilization of gastric content in the absence of sputum, 100 positive bacteriological findings were obtained as against 32, which would have been the number had the examinations been restricted to the microscopic search of smears of sputum. The fact that the figure for positive results obtained by direct microscopic examination (32) compares so unfavourably with that attending sputum cultures (46) cannot be attributed to hurried or inadequate scrutiny. Considerations of economy of effort, culture medium and incubator space, and the possibility of summary disposal of the specimen with an immediate positive report were strong inducements to persevere in the search for acid-fast bacilli in the films.

Such findings constitute a compelling indication for the cultural examination of sputum whenever pulmonary tuberculosis is in question and acid-fast bacilli are not apparent in film preparations. As a means of sifting sputum and other pathological exudates for tubercle bacilli, the method of microscopic search is a sieve of very coarse mesh, and an unsound basis for estimates regarding arrest of pulmonary disease in the individual and his potentialities as a focus of infection in the community.

Sputum, as the principal vehicle by which tuberculous infection is distributed, no doubt merits primary consideration; but direct cultivation is just as efficacious for the demonstration of bacilli in other products of tuberculous activity as in sputum. Among 346 cultures of *Mycobacterium tuberculosis* collected during the last three years from sources other than sputum or gastric content, there have been only six in which it was necessary to invoke the assistance of the guinea-pig.

It is still the practice in many laboratories, when the search by microscope has failed, to resort forthwith to guinea-pig inoculation with no consideration of the prospect of revealing tubercle bacilli offered by cultivation. In view of the reliability and sensitivity of approved methods of culture of *Mycobacterium tuberculosis*, it is questionable whether the guinea-pig should be permitted to retain the exalted position that he has held in the past. Indeed, it is not difficult to find in the relevant literature reports by accredited workers in which direct cultivation of tubercle bacilli has improved upon the results obtained by guinea-pig inoculation. A report by Norton, Thomas and Broom, issued from the Department of Health, Detroit, Michigan, is doubly interesting as showing the general utility of cultivation and its apparent superiority to animal inoculation. The workers named were interested primarily in specimens other than sputum, and particularly in such as appeared to be devoid of acid-fast bacilli by careful and prolonged microscopic search. By the cultural examination of 394 specimens, exclusive of sputum, submitted for confirmation of clinical diagnosis of tuberculosis, and found to exhibit no acid-fast bacilli on microscopic examination, Norton, Thomas and Broom[11] recovered tubercle bacilli from 137, or 34·8%. Another phase of their work was the application of cultural methods and animal inoculation in parallel to 151 miscellaneous specimens suspected of a tuberculous origin. A positive finding was recorded by both methods in 35 instances; the guinea-pig method succeeded three times when the culture failed; but cultivation registered 16 successes in cases in which the inoculation method failed. These data left the advantage with the cultural method; but it is evident that neither was infallible.

Table III embodies my own experience up to the point at which I discarded guinea-pigs for routine use and assigned to them the roles of adjuvants to cultivation in special cases and supporters of virulence tests. In this small and therefore inconclusive series the cultural method again appears the more successful.

TABLE III.

Comparison of the Results of Cultivation with those Attending Guinea-pig Inoculation.[1]

Observation	Results.
Guinea-pig "positive"	6
Culture "negative"	
Guinea-pig "negative"	11
Culture "positive"	
Both "positive"	13
Both "negative"	17

[1] Average reporting time for 19 guinea-pigs, 32·4 days; average reporting time for 24 cultures, 14 days.

Sweany and Evanoff[17] found direct cultivation more successful than animal inoculation; but the most exhaustive investigation of this question that I have been able to locate leaves the advantage with the guinea-pig. Hoyt, Holtzwart, Kuntzner and Fisk[14] applied cultural methods and animal inoculation in parallel to no less than 2,439 specimens submitted for bacteriological diagnosis of tuberculosis over a seven-year period. Of 345 positive results, 57% were to be attributed to both methods. In 30% the guinea-pig provided a positive finding not recorded by the cultures, and in 13% cultivation disclosed the presence of *Mycobacterium tuberculosis* when the guinea-pig failed to do so.

The imponderable personal element, on which depends selection and preparation of culture media and general proficiency in technique, is such an important factor in successful cultivation of *Mycobacterium tuberculosis* that it is not surprising that the efficacy of the cultural method, as compared with that of animal inoculation, shows variation in the hands of different workers. In an impartial commentary on the relative merits of the alternative procedures, G. S. Wilson[15] concludes that there is little to choose between them, but is inclined to award what advantage there may be to the guinea-pig.

It can be argued reasonably that even if the inoculation technique has proved slightly more sensitive, its minimal superiority is offset by other factors which favour the cultural method. In small laboratories facilities for keeping animals are often lacking or are inadequate for proper isolation. Culture methods are much the less expensive and declare the result three or four weeks sooner than the guinea-pig is in the habit of divulging it. Inexplicable and premature death of the guinea-pig is a not infrequent occurrence in the animal inoculation test, and a corresponding weakness in the cultural technique is the occasional appearance of contaminating bacteria and moulds. In any large series of cultures, however, the number of contaminated tubes should not be more than 10% of the total. Premature death of a guinea-pig carrying an important inoculation has more than once in my experience nullified the investigation, and for all the light thrown on the occurrence by an autopsy, the animal might have succumbed to the weight of its responsibility.

The notable advances in the technique of cultivation of *Mycobacterium tuberculosis* have reduced the status of the traditional laboratory guinea-pig. He has "fallen from his high estate", at least to the extent of being compelled to recognize a rival of equal efficiency in a domain in which he was for so long unchallenged. It is obvious that in the examination of specimens in which difficulty in the recovery of tubercle bacilli is to be anticipated, such as cervical glands and pleural exudates, both animal inoculation and direct cultivation should be employed. It is equally plain that, as a means of coping with large numbers of specimens, such as sputum in public health laboratories, sanatoria and tuberculosis clinics, or sputum and gastric contents on the scale on which I have collected such products from Australian Imperial Force recruits, guinea-pig inoculation is slow, cumbersome, expensive and totally impracticable.

"Saprophytic" Acid-Fast Bacilli.

A routine laboratory diagnosis of tuberculosis based on cultural methods to the exclusion of animal inoculation may be criticized legitimately on the ground of the existence and occasional intrusion into cultures of acid-fast bacilli other than mammalian tubercle bacilli. Such microorganisms are of widespread distribution and varied habitat; they have been described by many workers in smegma, butter, milk, grass, manure, soil, human fæces, nasal mucus, the tonsil, sputum in the presence of pulmonary gangrene, pleural exudate, pus of a cold abscess, and water. Certain of the so-called "saprophytic" acid-fast bacilli have a curious affinity for metal, as is illustrated by the demonstration by Schwabacher[16] of acid-fast rods in scrapings from the slime coating the inside of every one of 56 cold-water taps. Microorganisms of similar character have also been found in the metal mouth-pieces of wind instruments.

There is an increased liability to erroneous interpretation of these organisms as true tubercle bacilli when they occur, as has been described by Pinner,[17] in cultures from morbid material derived from patients who are undoubtedly tuberculous, or concerning whom strong, though unconfirmed, clinical suspicion of tuberculosis exists. As complicating the matter further, Pinner has recorded the occurrence of "saprophytic" acid-fast bacilli along with true tubercle bacilli in cultures from the sputum of a phthisical patient and from the urine of another patient affected with renal tuberculosis and tuberculous epididymitis. The acid-fast bacilli described as "saprophytic" are not always as innocuous in pathogenicity tests on animals as this term would imply, and strains such as the "M" bacillus of Cummins and Williams,[18] and the "Ryan" culture of Beaven and Bayne-Jones,[19] have acquired some notoriety in connexion with human disease. Both were acid-fast bacilli other than *Mycobacterium tuberculosis*, and on the evidence provided by thorough investigation pathogenic activity could scarcely be denied to either of them. The "M" bacillus was recovered by Cummins and Williams, and by A. S. Griffith, independently, from the sputum of a young woman exhibiting the clinical, radiological and systemic picture of acute pulmonary tuberculosis, and the "Ryan" bacillus was recovered by Beaven and Bayne-Jones from the purulent pleural fluid of a girl. Interesting studies of acid-fast bacilli other than mammalian tubercle bacilli isolated from diseased tissue in man are those of Arnold Branch[20] and Max Pinner.[21]

The non-specific acid-fast bacilli, some of which exhibit in varying degree a capacity to inflict tissue damage in laboratory animals, and even to induce sensitization to tuberculin, form an interesting group; but to discuss them at greater length would perhaps suggest an exaggerated degree of probability of meeting them in routine cultural work for the detection of *Mycobacterium tuberculosis*. The experience of Max Pinner, in his intensive cultivation of *Mycobacterium tuberculosis* at the Desert Sanatorium and Institute of Research, Tucson, Arizona, has been that the number of culture tubes prepared for *Mycobacterium tuberculosis* in which chromogenic acid-fast "saprophytic" bacilli have appeared is "much less than one per cent" of the total. The cultural characters of the majority of these bacteria are such as should cause their identity as *Mycobacterium tuberculosis* to be questioned immediately by a worker experienced in the cultivation of tubercle bacilli. Relatively rapid growth in comparatively simple media, considerable latitude with respect to temperature of incubation, and the development of smooth hemispherical or dome-shaped colonies readily amenable to emulsification, are properties which distinguish the "saprophytic" acid-fast bacilli and contrast with the slow evolution of the papillary or "bread-crumb", friable, non-emulsifiable colonies of *Mycobacterium tuberculosis*. Within recent months I recovered in pure culture from the gastric content of a child an acid-fast bacillus exhibiting a smooth, moist, butyrous growth and orange-red pigmentation. I would not for one moment accept such a strain as *Mycobacterium tuberculosis* without further investigation and proof of its ability to induce progressive tuberculosis in a guinea-pig. Certain strains of non-pathogenic acid-fast bacilli, however, as described by Schwabacher,[16] are "rough", and such strains simulate *Mycobacterium tuberculosis* more closely.

In the overwhelming majority of instances in which an acid-fast bacillus of the requisite cultural characters is recovered from pathological tissues and exudates, the total of evidence, clinical, radiological and bacteriological, places the diagnosis of tuberculosis beyond reasonable doubt. In the few in which the cultural characters are anomalous, or the bacteriological finding is at variance with clinical and radiological estimates of the condition, the guinea-pig may always be called in as adjudicator.

Conclusion.

The object of presenting the results which I have obtained during the last three years in the direct cultivation of *Mycobacterium tuberculosis* is to support the contention that cultivation of this ubiquitous menace to public health should be a matter of routine in all health, hospital and sanatorium laboratories. The technical methods involved require no elaborate equipment, and *Mycobacterium tuberculosis* should receive the same treatment as diphtheria bacilli, meningococci, and other pathogens of everyday occurrence, which when not evident in a film preparation of suspected material, are immediately subjected to appropriate measures for their cultivation. In particular I would urge that the elementary procedure of staining and searching film preparations of sputum as a standard for the bacteriological diagnosis and control of pulmonary tuberculosis is illogically and deplorably low.

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A METHOD OF DEALING WITH FRACTURES THROUGH THE INFRAORBITAL MARGIN.

By T. BOYD LAW, F.R.A.C.S., D.O.M.S. (England),
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THE following technique for dealing with fractures through the lower orbital margin has been found to be of great value. I have not been able to find a description of such a method, and the technique is so simple and the results in the matter of alignment and prevention of subsequent deformity are so satisfactory that I am sure it would be helpful to anyone who has to deal with such a condition.

One was impressed by the frequency with which fractures in this region, following direct violence, ran through, or in close proximity to, the infraorbital canal. One could always feel the dipping downwards and inwards of the orbital margin lateral to the fracture. A fracture of the zygomatic arch which sometimes bulged outwards was a frequent accompaniment, and the patient often complained of numbness or pain in the distribution of the infraorbital nerve.

Technique.

The method is as follows. Preliminary medication is carried out with morphine and hyoscine, or with "Avertin", and the skin is carefully prepared. An injection is given of 1% "Novocain" solution with adrenaline (1 in 40,000) at the site of the fracture and radiating out over the surface of the maxilla and zygoma and over the floor of the orbit. Gentle pressure is made with the forefinger on the orbital margin lateral to the fracture, and after the œdema has been expressed a horizontal incision no longer than a quarter of an inch is made with a number 12 Bard-Parker blade right down to the bone and through the periosteum. The incision through the periosteum should lie about one-eighth of an inch below the free orbital margin. A Freer septum stripper is passed into the wound and down to the incision in the periosteum, and the latter is freed from the bone, care being taken not to penetrate the orbital septum. This stripping of the periosteum is continued up to the orbital margin and then along the floor of the orbit, so that an area of bone, about half an inch square, of the orbital floor adjacent to the orbital margin is bared of its periosteum. A button-hook or perhaps some similar bone hook (a heavy one is sometimes required) is inserted into the wound and the point is made to travel through the track already prepared for it; when it overlies the orbital floor it is made to break through into the antrum, care being taken that this is done at a point as far away from the infraorbital canal as possible. It is then easy to pull the bone up into position, and if the operation is undertaken early enough and the fracture is not too extensive there is no danger that the bone will slip out of position again. As one pulls the bone up one can feel the zygomatic arch straighten out into its normal contour. A single horsehair suture closes the wound and a small dressing of collodion is applied.

Discussion.

Eight patients have been treated by this method, and the causes of the fracture have been as follows. A blow from a cricket ball caused the fracture in two cases and a fall against a wall caused it in one case. A blow from a rivet, weighing about a quarter of a pound, that fell from a height of 40 feet was responsible in another case; the patient looked up in good time to catch it over his zygoma. This patient was first seen a week after the accident; but nevertheless the bone remained in good position after reduction. A blow from a piece of falling timber caused another such fracture. This fracture was very extensive and involved the alveolus on this side. The remaining fractures were all due to a blow from a fist ("king hits", the patients said).

The results were most satisfactory in all cases except that of the man who had the extensive fracture which

passed right down through the alveolus. Supplementary treatment would be necessary in cases of this nature. No undue reaction was observed in any of the cases, and recovery was uneventful. The small scar is generally invisible in a few weeks, and in any case is amply compensated for by the disappearance of the deformity, which would have already been carefully observed by the patient himself.

An infected antrum would, of course, be a contra-indication to the employment of this technique; but so far I have not met with this condition in dealing with these patients. In any case the orbital contents must be respected by the surgeon's keeping well outside of the fascia which walls them off. The slight injury to the roof of the antrum through the sterile field is nothing when one thinks of the great number of antrum punctures that are undertaken every year through the inferior meatus.

THE TREATMENT OF "THE EFFORT SYNDROME".

By A. GRAHAM BUTLER,
Canberra.

IT has been said with authority that what God has joined together, man shall put asunder only at grave peril of loss and detriment. In the early years of this century, for reasons which are generally acknowledged to have been at the time good and sufficient, even inevitable, a "bill of divorcement" was granted, not without protest, between physiological and psychological medicine. (The name of the co-respondent in the case is too august for casual mention.) But the *decree nisi* has not yet been made absolute, and there are not wanting signs that, with a little encouragement, and in particular with the help of some tactful face-saving gestures on behalf of the lady, the parties may yet rejoin hands and hearts, with happiness to themselves and benefit to the community. I have been constrained to venture—perhaps to rush in—on this emotionally charged field, through cogitation upon articles and annotations appearing in the medical journals, which deal with that very common cause of war and post-war disablement "The Soldier's Heart and the Effort Syndrome",[1] read in the light of Australian experience in the war of 1914-1918. Space does not permit—nor does necessity require—an examination, even in outline, of the history of this "disorder"; da Costa, as I gather, regarded it as an authentic "disease", complete with a "cause" and a pathology. But I would suggest that there is a tendency—common in much of our contemporary medical writings—to look on the condition as a new discovery, whereas it was "known to the ancients" and was, it would seem, almost as great a bugbear in the Crimean War as in that of 1914-1918.

The word "almost" serves to link this preamble with my comments, and perhaps as well to link psychology with physiology in the pathogeny of "the effort syndrome". It seems to me justifiable to believe that modern wars, like modern medicine, are more highly charged with "emotion" than were those of the past; that the great incidence of "soldier's heart" in the war of 1914-1918 is a reflection of a greater psychological content in the war sickness of these days than it was in those of our less introspective and more hard-bitten forebears; and that we may see in this a reflection of the fact that, in "the effort syndrome", the physiological and the psychological are so mixed up that their dissociation and analysis lead only to a clinical phantasy and thus to a field of therapeusis not proper to the Freudian nor to the neo-cardiologist, nor yet to the physiotherapist.

We have (as I propose) in our modern furore for analysis and the "analytical" outlook (essential in its proper place, and with proper regard for resynthesis) lost touch with the line of approach which, in reference to his special field of statistical research, Professor Major Greenwood has termed "the observational method"—the method of Hippocrates, of Boerhaave, of Sydenham, of John Hunter, of Sir William Gull, and generally of British medicine, and in our own time of Sir James Mackenzie and Sir Thomas Lewis. I juxtapose, for contrast, without odium to either line of approach, quotations from recent writings in *The British Medical Journal*, with observations made in the command depots in the United Kingdom in 1917-1918 by Colonel McWhae.

The Analytical Line of Approach.

In 30 soldiers suffering from varying degrees of effort syndrome it was found that the velocity of blood flow, estimated by the saccharin and ether methods, was not appreciably altered. The normal arm-to-tongue circulation time (saccharin method) lies between 9 and 16 seconds (Fishberg, Hitzig and King, 1934), and in 27 of our patients it fell well within normal limits. In the remaining three individuals readings of 8 seconds, 8 seconds, and 6 seconds, respectively, were obtained; these variations were not considered significant. Likewise the arm-to-lung circulation time (ether method) was found to be normal in each case: normal time lies between 4 seconds and 8 seconds (Hitzig, 1935).

These studies were made on patients who had been lying down for fifteen to thirty minutes. They show that under such conditions the velocity of blood flow was normal. The next point to investigate was the effect of exercise on the circulation rate. Each patient was made to skip with a rope for five minutes; the ether time and saccharin time were then taken and repeated five minutes later. Twelve patients were studied by this method after controls had been observed in twelve normal soldiers. The results are summarized . . .

In no patient was there an abnormal increment in the circulation rate, and in only one was there an appreciable delay in the return to normal. These findings are in contrast with those observed in hyperthyroidism after exercise. Bansi and Groscurth (quoted by Fishberg, 1937) found that in hyperthyroidism the increase in cardiac output during exercise was excessive and that there was a delay in the return to normal after cessation of effort.

In effort syndrome patients, then, we may infer that any distress experienced during or shortly after physical exertion is not due to any fundamental weakness of the *cardio-vascular* mechanism. Rather is it an indication of abnormal *nervous* reaction. The majority of affected individuals tested as described above experienced faintness, palpitations, left mammary discomfort, or vague general distress, and the emotional factor was obvious. Herein lies the inadequacy of exercise-tolerance tests. The emotional component cannot very well be excluded, and it colours the whole test. The routine tests more often determine the training, the physical fitness, and the nervous state than the degree of cardiac efficiency. In patients suffering from the effort syndrome it is the former factors which determine the unusual response to such tests.[2]

The "Observational" Line of Approach.

The following is taken direct from the Australian official medical history.[3]

"D.A.H." The more or less specific symptom-complex known before the Great War as "Soldier's heart", and in the British Army officially as "Disordered action of the heart" ("D.A.H.")[4] was early in evidence in the Command Depots as a cause of unfitness among "medical" cases from France. Eventually it proved one of the most clinically obscure among the "medical" conditions causing disablement and one of the most difficult to deal with. In the early months of 1918 (Colonel McWhae notes) "cases of D.A.H. accumulated in Command Depots, and S.M.O.'s were very doubtful as to the best method of dealing with them". The clinical work of Thomas Lewis during 1915-17[1] in the British special military hospital for heart disease at Hampstead, and later at Colchester, had been followed and, early in 1918, the system of treatment advocated by Lewis ("graduated drills") was studied at first hand and then tried in the depots. A number of "D.A.H. cases" were collected at No. 3 Command Depot and graduated training carried out "on the lines used at Colchester".

"The results, here at any rate", says Colonel McWhae, "were not satisfactory. It was found that under these circumstances the attention of the patients was unconsciously directed continuously to the cardiac condition by the very fact of their being grouped together, and by the

[1] Dr. (later Sir) Thomas Lewis worked as a member of the staff of the British Medical Research Committee. See "Annual Reports" of the Committee for 1916-1917 and 1917-1918, and preface to "The Soldier's Heart and the Effort Syndrome", by Thomas Lewis.

observations of pulse rate which were made in order to determine their reaction to effort. It was decided, therefore, not to give separate training in special classes, or in special units to cases of this type, as it was considered that such methods had a powerful effect in suggesting unfitness." On 29th May, 1918, the use of the term D.A.H. was discontinued and in lieu thereof the term "Effort Syndrome" was used—in view of the fact that "there was no evidence that the condition was cardiac in origin". From this time a clear-cut policy was pursued.

"Soldiers with this disability were not given separate training in special classes, but received ordinary graduated Command Depot training. The majority were transferred to the O.T.B. and the number retrograded there as unfit for active service was, comparatively, very small. Except in the case of obviously ill soldiers, the only way to decide as to their fitness or otherwise for service was to give them graduated training in this way."

I venture to propose that the most effective line of therapeutic approach to the clinical problem of "D.A.H." is that proposed by McWhae. And, greatly daring, I venture further to support this by an *argumentum ad hominem*. I have not, I hasten to state, suffered from the "effort" or any other psychic syndrome. But many years ago (as a medical student in fact) I observed that the physiological phenomenon, "the second wind" of a runner, could be reproduced psychologically. I feel sure that the following observation will be confirmed by athletes, that in suitable circumstances, as in introspective anticipation of some great athletic struggle, or even more readily in retrospect of some narrow victory or defeat in a first-class and highly exciting event, a runner will go through the psychological and physiological symptoms and signs of the psycho-physical adjustment which is the "second wind", so well known to the imperfectly trained athlete. Not only does he experience the emotional excitement, but he also experiences the physiological stimulation. The thumping heart, the augmented respirations, the aching calves, and, most striking, the precordial pain, are reproduced with vivid and exhausting exactness—a veritable "effort syndrome" motivated by the imagination.

I propose—a sheer "Aunt Sally"—that, when it is not due to frank disease, such as tuberculosis or neurosis, such as "anxiety", the effort syndrome is a symptom-complex which reflects a failure to rise to the psychological and physiological adjustments which correspond to the "second wind". The man has lost, or has never had, the "will power" and the emoto-reflex urge necessary to carry him through a physiological "effort", which, for him, in the circumstances, is emotionally overcharged as well as physiologically difficult. On both counts his "ability" is liable to war-engendered degradation—physiological, as through trench fever or other infection, psychological, in the loss of will power, inherent or war-engendered, which is the essence of the psychoneurotic state, "constitution" or "temperament". He is, in very type, the "unconscious malingerer".

I should like to see this experiment made: that a group of fairly recent "cases" of "the effort syndrome" (after elimination of men exhibiting too gross or long-standing departure from the physiological and psychological norm) be treated on lines based on this hypothesis. They should be told that their trouble is simply that they have not properly learned "to get their second wind" or that they have lost it, temporarily, through some untoward experience, such as sickness or prolonged mental or physical strain. The physiological and psychological factors involved in their condition, and also in the "second wind", should be explained to them in simple commonsense and "sporting" terms, such as are a commonplace in the sophisticated sporting world of today. Adequate inducement to succeed should be available—equivalent, for example, to the desire of achieving the same mastery of self in a big race. Even if this should involve an assurance of employment away from the front, and in circumstances which should involve not too great mental or physical strain, it would probably be worth while. The group should not consist only of men suffering from "D.A.H."; incidentally, the taboo on the mention of "heart" should be entirely lifted, in favour of an explanation on the lines suggested above. But the group should consist, as was proposed by McWhae, of ordinary convalescents recovering from purely physiological disabilities—to perpetrate, *ex hypothesi*, a heresy, but "you know what I mean"! The object of this intermixture is, as is stated by McWhae, to imbue the men with the idea (which is also the truth) that in their inability to undertake effort without distressing symptoms they differ in no way from these others, except in their mental inability to face the effort of will required to achieve or regain control of this physiological "second wind". The technique of this "graduated training" was worked out to perfection, chiefly by games, in the Australian command depots in the United Kingdom in the late war. Can we not learn from this experience?

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SUICIDE AND ITS PREVENTION.[1]

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TWO HUNDRED suicides have come to autopsy at the hands of Dr. Johnson, Dr. Hayes and myself in the last five and a half years. Two hundred persons of all types—old and young, rich and poor, sane and insane—have alike confessed hopeless defeat in the battle of life and have passed on in a tragic procession. In age they have varied from a boy of sixteen, who shot his foster-parents and then himself, to a widower of eighty-four with an enlarged prostate, who found life lonely and miserable and hanged himself. In each sex the highest incidence was in the age group from forty to forty-nine years (Table I). But when allowance was made for the decreasing number of people with advancing age, the greatest relative incidence was found two decades later. This is similar to the Commonwealth Statistician's finding in 1912. In series from some other countries the relative incidence continued to increase to the highest age group.

TABLE I.
Two Hundred Suicides: Age and Sex Incidence.[1]

Age Group. (Years.)	Males: Number of Suicides.	Males: Rate per 100,000 Males at Each Age Group *per Annum*.[2]	Females: Number of Suicides.	Females: Rate per 100,000 Females at Each Age Group *per Annum*.[2]
10 to 19	2	1·3	2	1·3
20 to 29	21	15·1	10	6·2
30 to 39	25	21·4	12	9·0
40 to 49	31	25·8	14	11·1
50 to 59	24	26·3	12	12·7
60 to 69	23	46·9	9	14·9
70 to 79	10	32·4	3	7·3
80 and over ..	2		0	
Totals ..	138	16·5	62	6·9

[1] The combined rate per 100,000 (both sexes) is 11·5.

[2] Figures showing the age and sex distribution of the population of Brisbane in 1938, on which the rates were calculated, were kindly supplied by the Queensland Government Statistician. The area from which the suicides were drawn is approximately, but not exactly, the same as the Brisbane city area.

Males predominated over females in a ratio of 2·2 to 1·0. The predominance was evident at all ages except under twenty years. Queensland and Australian figures in general

[1] Read at a meeting of the Queensland Branch of the British Medical Association on April 4, 1941.

show a still higher male predominance—usually a ratio of over 3·0 to 1·0.

The monthly and seasonal totals of our cases over an exact period of five years (June, 1935, to May, 1940) are shown in Table II. The fewest cases occurred in winter; otherwise seasonal differences were not apparent. In Europe a seasonal fluctuation in the suicide rate is pronounced, the rate being highest in summer and lowest in winter.[1] In Australia also the number of suicides increases in summer and decreases in winter; but the fluctuation is much less than in Europe.[1,2] Dr. Thelander has suggested to me that the decrease in winter may be due rather to the increase in social activities then than to the lowered temperature.

TABLE II.

Suicides in Brisbane: Monthly and Seasonal Incidence.

Period.		Number of Suicides.
Winter:		
June	16	
July	9	37
August	12	
Spring:		
September	20	
October	13	48
November	15	
Summer:		
December	10	
January	25	47
February	12	
Autumn:		
March	21	
April	17	52
May	14	
Total for five years		184

A curious feature of suicide in Australia is the variation in rate in the different States (Table III). Practically every year the States keep the same relative positions, with Tasmania lowest and Western Australia highest. The reason for this variation is an intriguing problem. Table III suggests some factors which may help to explain it. Thus the order of States for the suicide rate is the same as the order of temperature, except for Western Australia (where the bulk of the population is in the south-west). The preponderance of suicide in Western Australia is perhaps related to its preponderance in alcohol consumption. For both Queensland and Western Australia the excess masculinity must influence the suicide rate.

TABLE III.

Suicide Rates of Australian States with some other Statistics for Comparison.

State.	Suicide Rate per 100,000 Living.[3]	Average Temperature of Capital City.[1,4] (Degrees Fahrenheit.)	Drink Bill *per Capita*.[5] (Pounds.)[2]	Masculinity.[6] (Males per 100 Females.)
Tasmania	9·2	54	3·1	101·8
Victoria	9·7	58	4·1	98·4
South Australia	11·1	63	3·7	100·4
New South Wales	12·2	63	4·9	102·7
Queensland	14·5	69	3·2	110·2
Western Australia	18·4	64	7·0	114·1
Australia	12·2	—	4·4	103·1

[1] The temperatures are averaged over many years. The other figures are averaged for the ten years ending 1938 or 1938–1939.
[2] The drink bills do not take into account interstate traffic.

Methods.

The methods employed to end life are set out in Table IV. They are similar to those in other published series. The use of firearms, drowning and hanging head the list, followed by falls from a height and cutting of the throat. Among poisons, "Lysol", carbon monoxide, strychnine and arsenic were the favourites.

For most of the carbon monoxide deaths the domestic gas supply was used. Three men used the exhaust gas from a car; two led it through a hose into the rear seat. One lay on the ground under his utility truck with his head pillowed on a rug. He lowered the muffler so that the exhaust gases would discharge directly onto his face.

The three who used phenobarbital were all receiving treatment with this drug.

One woman with polycystic kidneys, hypertension and alcoholism had been attending an out-patient department for fifteen months and had been saving her tablets. After her death 226 half-grain tablets were found in her room.

Six persons adopted a double method. (Only the principal method in each case is included in Table IV.)

TABLE IV.

Two Hundred Suicides: Method Employed.

Method.	Male.	Female.	Both Sexes.
Firearms	33	1	34
Drowning	20	15	35
Hanging	17	11	28
Fall from a height	13	3	16
Cut throat	9	2	11
Run over by train	4	—	4
Cut artery	1	—	1
Cut vein	1	—	1
Strangulation by wire	1	—	1
Setting clothes alight	—	1	1
Poisons:			
Lysol	10	14	24
Carbon monoxide	10	7	17
Strychnine	9	1	10
Arsenic	5	1	6
Phenobarbital	—	3	3
Cyanide	3	—	3
Phenol	1	—	1
Phosphorus and methyl salicylate	1	—	1
Hydrochloric acid	—	1	1
Morphine	—	1	1
Mercuric chloride	—	1	1
Totals	138	62	200

A white girl, aged twenty-five years, married a Japanese laundryman. Four months later she drank four bottles of iodine and then cut her throat. Her father had cut his throat ten years before; her mother was in a mental asylum.

A man, aged forty-eight years, was a first-class restaurant keeper. He became an alcoholic, neglected his business, quarrelled with his partner, walked out of his business in Sydney, and came to Brisbane "to show that he could make good again". A fortnight later he sat on the river bank for an hour and a half, then took off nearly all his clothes. He cut his throat and went into the river. Though he was pulled out alive, he died a few minutes afterwards.

Another man cut his throat with a kitchen carving knife, then walked fifty yards and lay down in a pool of water. Another made many ineffectual cuts on his abdomen with an old table knife before throwing himself into the sea.

Early one morning an old man, aged eighty years, was found dead on the railway line in Victoria Park. A trail of blood led back from the line for 100 yards. Reconstruction of the event suggests that he first made several shallow cuts on each wrist and walked on bleeding. Near the railway line he cut his throat, severing the left jugular vein, and lay down. Here was a pool of blood and near by a blood-stained razor. Then on the approach of a train, he shortened his wait by lying down in front of it.

A man, aged thirty-nine years, enlisted in Cairns. During the journey to Brisbane he was peculiar in manner, drinking, and difficult to manage. He arrived at camp on a Wednesday, disappeared on Thursday, and on Saturday was found under a recreation hall lying supine, with two turns of electrician's wire wound tightly round his neck and twisted at the back, and five shallow cuts under the chin. A safety razor blade was near by. The cuts had evidently been made first. When they failed, strangulation was accomplished with the wire.

Another case, at first sight an example of a double method, is instructive.

A woman, aged forty-one years, was found dead with her head in the oven, and showed the cherry red colour characteristic of carbon monoxide poisoning. In the lower end of the œsophagus was a small mass of white powder. The mucosa in contact with it was white and necrosed. To my surprise the analyst found the powder to be simply phenacetin and caffeine. It was a disintegrated five-grain tablet.

The damage to the mucosa caused by contact with the undiluted drug emphasizes the unwisdom of taking powders or tablets without accompanying fluid. Such necrosis, occurring in the stomach, might readily become the starting point of a peptic ulcer.

Imitation may determine the method.

A woman, aged forty-three years, worried about the conduct of her daughter, read an account of a mother taking "Lysol" because of some trouble with her daughter. She said to a friend: "This is what I intend to do. I will take a cup of 'Lysol' and finish myself." Five days later she did so.

The coming into sight of a means of suicide may cause a person impulsively to adopt it.

A man, aged forty-nine years, who had suffered for three years from a nervous breakdown, was on holiday. He went for a walk in the scrub and shortly after was found hanging with a loop of vine round his neck. The sight of this dangling loop of scrub vine had apparently offered him an irresistible invitation.

Insane persons desiring to end their lives are notorious for resourcefulness in finding a method in spite of supervision, and determination in carrying it out. Three such examples occurred in this series.

A female, aged twenty-nine years, a suicidal manic-depressive at a mental hospital, was in a room by herself. She had been violent all day. She was seen at 7.30 p.m., screaming. At 8 p.m. she was found lying prone, with her face immersed in a chamber pot full of urine. At the autopsy foam was found issuing from the mouth and filling the larynx and trachea. The lungs contained a little blood-stained fluid with the odour of urine. The stomach contained about half a pint of fluid smelling of stale urine. During the afternoon she had repeatedly asked for water to drink, so that there should be enough urine.

Another mental hospital inmate, a man, aged forty-two years, broke off the round top of a cigarette tin and sharpened it on a stone. With this crude blade he made three cuts in the left side of his neck and six in the right side and died a few minutes later. Most of the bleeding came from a large anterior jugular vein. Both sterno-mastoids were cut into, but the carotid arteries and internal jugular veins were intact.

A gifted and intelligent girl, aged eighteen years, became melancholic. Twice she attempted unsuccessfully to destroy herself. One morning she tipped a bottle of mineral turpentine over her clothes and set them alight. She died four hours later.

Recently a man, aged fifty-nine years, who appeared to be sane, adopted the same method. (This case is not included in the 200.)

The man bought a motor bus run and was disappointed with the takings. He bought a gallon tin of petrol, drove his car to a lonely road, poured half the tinful over his clothes, walked back a few yards from the car and set himself alight. He died in hospital seven hours later.

Causation and Motivation.

The interpretation of the psychological processes resulting in suicide is the province of the psychiatrist, not of the pathologist. Nevertheless my association with these cases tempts me to make some comments, superficial and inadequate though they may be. My knowledge of the motives has not been derived at first hand. It is based on information collected by the police officer from relatives and friends and presented as evidence in the coroner's court.

Frequently the victim left a note. It was usually a simple note of farewell and rarely helped to explain the act. One note, however, was self-revealing; five pages of jumble and repetition clearly demonstrated the insanity of its author.

Such causative factors and possible factors as were elicited are summarized in Table V. Because of the lack of psychological investigation, the figures given (except in the organic disease groups) must be gross underestimates of the frequency of those factors.

TABLE V.

Two Hundred Suicides: Possible Ætiological Factors.[1]

Possible Ætiological Factor.	Number of Suicides.	
Certifiable insanity	14	36
Neuropathy—probably insanity	22	
"Nervous breakdown"	28	
Epilepsy	2	
Severe, incurable or distressing organic disease	20	44
Organic disease of less severity	17	
Old age (over seventy years)	15	
Money worries—poverty, gambling, stealing *et ceteras*	35	
Sex problems	32	
Alcoholism	28	
Guilt and shame	12	
Bereavement	10	
Cancerophobia	4	
Possible lead poisoning	4	

[1] All the figures, except those of the organic disease groups, are gross underestimates of the incidence of the factors.

The decision to take one's life results, like any other decision, from the interaction of two essential factors—the functioning mind and the circumstances creating the problem. One or other factor may predominate. At one end of the scale is the mind so inadequate that it collapses before a trivial or imaginary problem; at the other end is the well-balanced mind that only an overwhelming catastrophe could drive to suicide. In discussing the mechanisms and motives that impelled these unfortunates, one may speak definitely about the cases at either end of the scale. Thus 14 of the 200 had been certified insane or were certifiable. Another 22 were neuropaths. Although they were not certifiable on the evidence that I obtained, I have little doubt that a fuller investigation would have proved most of them insane.

In contrast to these were 20 patients with advanced, incurable or painful organic disease. One can readily understand the victims of inoperable carcinoma, advanced pulmonary tuberculosis or enlarged prostate with cystitis seeking to end their misery. One old man who drowned himself had had a generalized exfoliative dermatitis for three months. Another man had suffered intolerable pain for two years from tuberculous inflammation of rib cartilages.

Another 17 patients had organic diseases of less severity which contributed to the decision to end life. With them may be grouped 15 persons aged over seventy years, for no doubt with these individuals the failing physical powers of advanced age were contributory.

In one group of 12 there had been a breaking of judicial or moral law, and when the day of reckoning came they could not face it. Three were to appear in court on the day they committed suicide; three were being questioned by the police and realized that "the game was up"; two others had embezzled the firm's money; four were shamed by various misdeeds of the past.

Now that these comparatively straightforward groups have been sorted out, the motivation of the others provides a much more complex study. Often the police inquiries indicated in a general way the nature of the motives; often only trivial motives were found; sometimes there was no explanation at all. As a large proportion of mental activity is on unconscious levels, so the conflicts that result in suicide must often be largely or wholly unconscious, and only to be revealed by a deep analysis. The trivial excuses often put forward were either rationalizations or the "last straw" in a mind on the point of exhaustion from hidden conflicts.

Worries connected with money were frequent. Sometimes the fault was with the social system, as with the man, aged fifty-three years, whose business failed in the depression, and with others who could not find employment. Sometimes the poverty was the fault of the victim himself, as with the retired manufacturer, aged fifty-five years, who went through £7,000 in eighteen months and found himself destitute.

Sex problems were frequently disclosed—jealousy, failure to win the loved one, broken engagement, broken home, double life *et cetera*—and no doubt much more frequently present but undisclosed. The only pregnant patient was an insane married woman who drank hydrochloric acid "because she thought she had cancer and the baby would get it too". Two unmarried mothers committed suicide some years after their children were born. Two persons, one male, one female, were about to be married. Several suicides occurred at the time of the menopause; but Table I does not indicate any striking prevalence of suicide at that age.

A history of addiction to alcohol was common. Its relation to the suicidal act was very varied. One man was a paranoic, some were drunken derelicts, some had been driven by alcohol from business or employment and brought to destitution. Sometimes the alcoholism was, like the suicide, a result of the mental conflict. Such a case is described later. Several persons committed suicide during the "morning-after" depression. Two seemed to be examples of the effect of alcohol in removing inhibitions and thereby exaggerating the mood of the moment.

Thus a man, aged fifty years, was sitting quietly drinking at home one Sunday morning. He had had several whiskies when he was reprimanded by his wife for drinking more than was good for him, because there were visitors coming. Thereupon he went into his bedroom and shot himself.

Apart from the addicts were a number who took a drink to give themselves Dutch courage for the act. Minogue[3] found that about a third of his series of suicides were alcoholics and that an attack of *delirium tremens* frequently ended in this way.

A "nervous breakdown" is frequently mentioned in the history, with its accompaniments of "nerves", worry, insomnia and inability to work. A "nervous breakdown" is not an explanation of the suicide, for suicide is only another symptom of the breakdown; but this group is important for prevention. Persons belonging to this group have declared themselves as potential suicides, and call urgently for intelligent management.

Motives were frequently multiple.

The body of a man, aged fifty years, much mutilated by sharks, was found in the river. He had been separated from his wife for two years. He was suffering from heart trouble and was in financial difficulties.

Sometimes a motive seems entirely absent.

A building contractor, aged twenty-eight years, in perfect health, happily married, with one son, aged four years, and prospering in his business, one day left his work in a suburb, drove to the city, and ascended the town hall tower. A few minutes later he fell 150 feet from it. No one saw him fall, but it could hardly have been an accident, as he had to climb over a breast-high guard.

Insurances were occasionally mentioned.

In the case of a business man, aged forty-one years, earning £1,000 a year, the desire to marry apparently conflicted with his undertaking to educate his brother's four orphans. He solved his conflict by shooting himself. A note stated that his insurances would give the children a good education and fit them for a start in life.

The solution appears drastic and no doubt there were other hidden motives.

Another man, aged thirty-nine years, in temporary employment, bought arsenic in February, insured himself for £1,000 in May, and took the arsenic in July, "because I am not in a position to give my family what they are entitled to".

If he thought the insurance would benefit his two daughters he overlooked that suicide within a year voided the policy.

In one case of obvious suicide the heir took extreme measures in an endeavour to have the word suicide erased from a certificate. This was done "to clear the family from the stain of suicide". All concerned were canvassed tearfully, and the police received anonymous letters accusing two of the deceased's friends of murdering him. All the measures were explained by the discovery of an insurance policy for £200—void for suicide.

In eight cases the lead in bone samples was estimated by the government analyst as part of a wider investigation. In four the amount of lead found was abnormally high.

A capable and overworked female clerk, aged twenty-five years, committed suicide on the approach of marriage, and another female clerk, aged nineteen years, when a man with whom she was infatuated would not marry her. Both these had mildly sclerosed kidneys.

A young married woman, aged thirty-two years, gave birth to twins in May, became confused and melancholic in August, and suicided in September.

The fourth of these suicides was a retired baker, aged forty-eight years, with granular kidneys and pulmonary tuberculosis. It is hard to say in these cases if the lead contributed to any extent to the suicide. It is conceivable that a mild encephalopathy or sclerosis of cerebral vessels may have decreased the efficiency of the brain.

At least 18 persons had made previous unsuccessful attempts at suicide. A family history of suicide was disclosed three times, a father, a brother and a sister respectively having killed themselves.

There were two cases of murder and suicide, and two of attempted murder followed by suicide. There was one suicide pact between a husband and wife.

Prevention.

Over and over again when called upon to perform an autopsy on a suicide, I have been distressed by the waste of life. It is tragic that a person with all his potentialities for usefulness to the world should come to regard his priceless gift of life as something futile, something evil, something to be discarded. We must face the question: "To what extent is this wastage preventible?" For the insane and for those overwhelmed by catastrophe there is perhaps little to be done; but for the remainder I see a fertile field for preventive medicine.

Here, for instance, is the case of a woman, aged thirty-two years, who lived with her husband and her two children and the husband's brother. She had had illicit relations with her brother-in-law for five and a half years. A year before her death she attempted suicide with strychnine, but recovered. The attempt was ascribed to ill-health. She then began to drink heavily, the alcoholism being obviously a symptom of her conflict. Eventually there were a discovery and a "show-down". Both her husband and her lover repudiated her, and she took cockroach poison.

That woman's life could have been saved had she come into proper hands after her first attempt at suicide. That attempt was symptomatic of the conflict between her conscience and her entanglement, and cried out for psychological investigation. A psychologist at that time would readily have found the basis of her conflict. Even a wise friend, untrained in psychology, in whom she could have confided, could have given her the help she needed to straighten out her life. Her shame showed that she was a decent woman who had drifted through propinquity into a wrong relationship, and she was unable to extricate herself without outside help. The tragedy is that that help was never given.

To allow anyone, particularly if young, to commit suicide as a result of a mental conflict is just as culpable as to refuse surgical treatment for appendicitis or medical treatment for diabetes or auricular fibrillation.

I look forward to the establishment of psychological clinics, where the mentally unhealthy may have skilled treatment. Other cities have their "soul clinics"; why not Brisbane? There will be abundant material to keep such clinics busy. Persons who have made unsuccessful attempts at suicide and who come to hospital or before a court could be referred to it. Magistrates would be glad of the clinic's help in dealing with sex and other problem cases. Practitioners could send appropriate patients to it, as for instance those patients suffering from "nervous breakdown" who do not readily respond to their treatment. Something more should be done for a difficult patient than to say, as was said by a doctor to the mother of one: "He is suffering from nerves; he will have to help himself."

For every suicide there are hundreds of mentally unhealthy—"men and women who cannot adjust themselves to the strains and demands of life today. They are the victims of anxiety. They fail to solve the problems of sex, marriage and home life. They are oppressed by the sense

of futility in a life for which they have seen no purpose. They cannot understand themselves and are ill-adjusted to their surroundings and their work" (Rose[7]). We meet these people daily. We note their anxiety, their self-pity, their futility. We observe the uncalled-for anger, unnecessary fears, minor displays of hysteria, crudities of behaviour, all indicative of hidden complexes and conflicts, of areas in their life where they are being defeated.

There is, therefore, abundant scope for psychological clinics, not only in preventing suicide, but also in restoring to fuller life the mentally unhealthy of all types. There they will find skilled help to solve their problems. Their hidden conflicts will be brought to the surface and resolved. They will be taught that for the moral lapse there is forgiveness, that for failure there can be a fresh beginning, that their life is not futile, but the unfolding of a divine plan. Then with minds integrated and souls inspired they will be able, not with Stevenson to "stop their ears against paralysing terror", but rather to face and conquer their problems and so "run the race that is set before them with a single mind".

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INFERTILE MARRIAGE OR STERILITY.

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STERILITY, as a subject, is certain to assume a growing importance in the next decade, and this is an opportune time to consider the proper methods of investigating and treating it. In general practice and in gynæcology it has for too long been relegated to a minor role, investigated inadequately and treated with a perfunctory indifference.

The observations on which this paper is based were gathered during the last three years at the sterility clinic of the Women's Hospital, Crown Street, Sydney, when 225 cases were investigated.

There is general agreement that about 10% to 15% of all married couples are sterile, and amongst the remaining couples there are varying degrees of fertility.

Our standard of what should be considered a sterile marriage is a time lapse of two years without the occurrence of any pregnancy, provided that no contraceptives have been used over that period. Some authorities have set the standard at four years, a time limit recommended originally by Matthews Duncan.

The terms "absolute" and "relative" sterility are so variously defined by different authors, that I have used the words "primary" and "secondary" instead. By "primary sterility" I mean that the patient has never conceived, and by "secondary sterility" I refer to those people who have had one pregnancy, but have not become pregnant a second time.

Two points need to be emphasized before I proceed to the clinical details of this subject. The first is that the male has been found to be a causal factor in an increasing number of childless marriages during recent years, and our incidence of male sterility or infertility at the hospital is about 20% to 25%. In the second place it is now realized that it is uncommon for one single fault to operate as a cause of any childless marriage. On the contrary, it is more common to find two or three factors, and these are referred to as the "infertility factors". Of these so-called infertility factors, however, one is usually paramount, the commonest being obstructed tubes in the female and azoospermia in the male (absence of spermatozoa).

Investigation of the Male.

At the clinic we had a 20% incidence of male sterility, and about half of the patients exhibited azoospermia. Therefore, about 10 males per 100 were absolutely infertile. We were successful in persuading about two-thirds of all the husbands to cooperate by submitting to examination.

Characteristics of Normal Semen.

Normal seminal fluid is slightly alkaline, the average pH being 7·7 with a British Drug Houses indicator. The normal volume is about two or three cubic centimetres at each ejaculation. Motility is usually exhibited by at least 80% of spermatozoa in a fresh specimen. The morphology of the normal spermatozoon is well known, and not more than 20% should show abnormalities of the head, middle piece or tail. Every cubic centimetre of seminal fluid should contain at least 50,000,000 spermatozoa. The buffering power of semen is high, so that there is no need to pay too much attention to so-called "acidity" of the vaginal canal. Hühner (1928) has observed that the presence of pus does not interfere with the motility of spermatozoa, and its presence is not a criterion of infertility. The presence of crystals is moderately common and not in itself diagnostic of infertility.

The Criteria of an Infertile Specimen.

It is usual to find more than one single fault present in an infertile specimen. If they are discovered in serial specimens of seminal fluid, the following findings indicate an unsatisfactory male: (i) a volume of less than one cubic centimetre; (ii) more than 20% abnormal head forms; (iii) persistent non-motility in fresh samples, not alone, but in conjunction with (ii) or (iv); (iv) a sperm count of less than 50,000,000 per cubic centimetre. Finally, it is appropriate to stress the fact that "the diagnosis of lowered fertility or even sterility is statistical, and any given patient may represent the exception to the rule" (Lane-Roberts, Walker, Sharman and Weisner, 1939).

How to Collect a Specimen.

The patient may ejaculate directly into a clean cold-cream jar or a condom may be used. In the latter case it is essential to cut the end off the rubber sheath as soon as possible after using it and to transfer the contents to a clean test tube, with which the husband has been already provided by the doctor. For preference use an old test tube that has been frequently washed so that it will be free from alkali. A cork is then applied to the tube and the contents are kept at room temperature until they can be handed in at the laboratory. One must stress the necessity for not trying to keep the semen warm, as it causes the sperms to spend their activity rapidly. The semen is transferred to a glass receiver, because it is a common observation that the rubber of the condom, and probably the boric acid with which it is dusted, cause the early demise of spermatozoa.

In the early days of our clinic we used to leave the semen in the condom, and our figure for non-motility was as high as 80%. It has now fallen to 10%, since the condom and tube method has been adopted.

How to Examine Semen.

Record the volume of seminal fluid and then make a clean slide. Put it under the microscope and observe the

motility. By running a few drops of brilliant cresyl blue (1% aqueous solution) under the cover slip, one can stain the sperms faintly and look for abnormal morphology. Some of the original fluid is then diluted 1 in 100 or more, Ringer's solution and methylene blue, or chlorazene, being used, and a sperm count is carried out. If motility interferes with the count, the hæmocytometer may be exposed to formaldehyde vapour for a few minutes before the estimation is begun (Weisner, 1939).

Remarks on Hühner's Test.

Details of Hühner's test may be found in his excellent book "Sexual Disorders". Briefly, it consists of a post-coital examination of semen taken from the cervical canal and vaginal pool in the posterior fornix. It should be carried out within two hours of coitus. Motile spermatozoa should be found in the cervix. A great difficulty in drawing conclusions from this test is to be sure that the absence of sperms from the cervical canal is a normal result for that patient, and not just a temporary finding, due to a sticky plug of cervical mucus. Furthermore, seminal fluid runs out of some vaginæ very easily. In any case, a semen analysis on the lines already indicated should be carried out first and Hühner's test should be reserved for special cases.

What is the Significance of Non-Motile Sperms?

Be very wary of drawing conclusions from non-motile sperms. This condition is important only if other abnormalities are also present, such as a low number of sperms or a large number of deformed heads, or if non-motility persists in many fresh samples. As a single finding on one occasion it has no significance.

The Treatment of Male Sterility.

When azoospermia is present the patient is referred to a urologist; usually the urologist does not receive him with any enthusiasm.

The urologist determines whether the patient is suffering from defective spermatogenesis or an obstruction in the *vasa efferentia*, either by performing a puncture of the testis under local anæsthesia or by taking a biopsy from it after incising the *tunica albuginea*.

If any of the characteristics of an infertile or unsatisfactory specimen are present, the patient should be subjected to a careful general examination, as the usual cause operating in these cases is constitutional rather than local. Search for focal sepsis, anæmia, hypothyreoidism and so on. Always try the effect of a few weeks' holiday in the open air before commencing on any course of gonadotropic hormones or testosterone.

Female Sterility.

The Investigation in General.

With regard to the investigation of the female, the usual gynæcological history is first taken, great care being exercised to inquire always about contraceptives. Some patients expect to become pregnant within three months of stopping the use of preventive measures. The further investigation consists of the following: (i) a general examination; (ii) a pelvic examination, including the use of a speculum and the hysterometer; (iii) a salpingogram; (iv) a premenstrual biopsy; and (v) occasional other tests, such as examination of a smear for leucorrhœa, estimation of the pH of the upper part of the vagina *et cetera*. At the clinic we have usually managed to gather all the requisite information at three sessions. The first interview covers the history and a full examination, the second is devoted to a premenstrual biopsy, and the third to the injection of oil into the tubes.

In performing a vaginal examination, make an estimate of the relative lengths of the *corpus uteri* and the cervix, and measure the length of the uterine cavity with a sound. The corpus should be longer than the *cervix uteri* in the proportion of two to one. The length of the cavity should be about two and a half inches in an adult, from the *os externum* to the top of the uterine cavity.

By the use of a speculum we can determine the presence of cervicitis, monilia or trichomonas infection.

The Investigation of Tubal Patency.

The patency of the tubes may be determined by the insufflation of air, oxygen or carbon dioxide, and also by the injection of iodized oil or "Perabrodil" (as used in excretion pyelography). "Perabrodil" may be diluted with gum acacia solution.

In this series of salpingographs we have used all the foregoing preparations, but have a preference for "Neohydriol" (May and Baker), an iodized oil compound that is much less viscous than the original and usually recommended lipiodol.

In our opinion the injection of some fluid preparation is much preferable to insufflation, as it shows not only whether the tubes are blocked, but also where the obstruction is situated. No anæsthetic is needed once one is accustomed to performing the test, and the dangers of oil embolism and of any other complication are much over-emphasized in the literature. They can be largely avoided by a proper selection of cases in the first place and by gentleness in injecting the oil. Furthermore, it is well known that "oil often passes when gas will not" (Greenhill). The best time for making this injection is in the mid-menstrual interval, when there is no congestion in the normal tube. A partially obstructed tube may appear to be completely blocked if the salpingograph is taken just before a menstrual period is due.

The Method.—The patient undresses in a room adjoining the X-ray department, and wears a dressing gown. She is placed on the X-ray table lying supine with her knees drawn up. The vulval toilet is carried out in the usual way and a large bivalve speculum is inserted. The cervix is swabbed with dry wool and painted with tincture of iodine. A small injection of local anæsthetic may be infiltrated into the cervix on the right side where the tenaculum will be placed during the next step in the procedure. No cervical dilators are necessary. The tenaculum is applied to one side of the *os externum* and plenty of room is left for the cannula to be pressed home firmly.

A 10 cubic centimetre syringe is fitted to the proximal end of the cannula and used to keep the acorn of the cervical cannula pressed against the os. Counter-traction may be made on the vulsellum. About six or seven cubic centimetres of oil are then slowly introduced into the uterine cavity without undue force and the X-ray picture is taken. If the film reveals that oil has already spilled into the pelvis, the patient need not return for a further picture; otherwise she should be told to come in twenty-four hours for a plain X-ray examination. The apparatus is then removed.

Types of Cervical Cannula.—The commonest type of cervical cannula is Bonney's acorn cannula, obtainable from any surgical house. It is as well when one is being ordered to ask the supplier to bore an extra hole at its tip for cleaning purposes, and to grind the aperture at the proximal end sufficiently large to accommodate the tip of a 10 cubic centimetre "Record" syringe. For the *multipara* it is advisable to have a larger type of cannula with a rubber acorn, such as is generally used for gas insufflation. One can also procure the cervical cannulas of Emmett Colvin in three sizes. These have a spiral tip and dispense with the need for using a tenaculum, as they can be screwed into the cervix; this effectively stops any backflow during the injection. They are very useful, except in a few acutely anteflexed uteri. Those seeking a reference to these cervical applicators will find them illustrated in "The Year Book of Obstetrics and Gynecology" for 1939, at page 372.

Incidence of Obstructed Tubes.

In our series of 225 cases the incidence of double blocked tubes has been about 20%, and a further 5% of patients have had badly obstructed tubes. In private practice the figure is somewhat lower, though still sufficiently high in sterility patients to make a tubal investigation essential. Many of these patients with obstructed tubes have already had an expensive course of hormonal injections elsewhere when seen at the clinic, because no tubal tests were first carried out

The Premenstrual Biopsy.

Biopsy of the endometrium is best carried out one or two days before the next menstrual period is due. In the case of patients with irregular menstrual cycles it can equally well be carried out in the first few hours after the onset of menstruation. This test is a simple method of determining whether or not a woman ovulates each month.

Amongst our cases the incidence of so-called anovulatory menstruation is low—about 3%. Some American figures place the incidence much higher. Rock and others (1939) found in their clinic that 9% of sterile women had occasional anovulatory menstruation, but that only 4% were habitually anovular.

Various cannula curettes are available for removing a piece of endometrium from the uterine cavity, especially Novak's, Randall's and McGregor's. They consist of a hollow tube about ten inches long, with an upturned cutting tip at the distal end, and with or without a suction plunger in the hollow of the cannula. We have used the model devised by Randall, of the Mayo Clinic.

Technique.—The patient is placed in the lithotomy position and the cervix is exposed with a speculum. It is then swabbed dry and painted with tincture of iodine. The curette is then gently introduced past the internal os without anæsthesia, and into the uterine cavity. One then pulls it firmly downwards and removes a strip of endometrium about one-third of an inch long, which is placed in formol saline solution. Further strips may be removed. The endometrium is then submitted to biopsy, and the secretory phase of the menstrual cycle should be present if the patient is ovulating.

It will be seen that this test is about 3% important, whereas the test for tubal patency is 25% important. One finds about an equal incidence of an inadequately developed secretory phase in our sterile patients.

Genital Hypoplasia.

In true genital hypoplasia the *corpus uteri* is either smaller or not larger than the *cervix uteri*. In the normal uterus the corpus is twice as large as the cervix. The normal distance from the external os to the interior of the *fundus uteri* is two and a half inches at least. Another type of hypoplastic uterus is the cochleate or "small anteflexed" uterus, with a relatively small cervix.

The Common Causes of Sterility in the Female.

It is impossible to make a list of all the infertility factors that would not meet with criticism of some sort, so I submit the commonest of those we have found in the female, as under: (i) blocked or obstructed tubes; (ii) genital hypoplasia, tumours and malpositions of the uterus; (iii) tumours and cysts of the ovary, and anovulatory menstruation; (iv) cervicitis, with a sticky mucous plug; (v) infections or obstructions in the vagina—for example, fungous disease, trichomonas or intact hymen; (vi) disorders of general health, and especially thyreoid deficiency.

Treatment of Female Sterility.

In this section I intend to cover shortly the present-day treatment of the commoner causes of sterility. I again stress the fact that in any given case it is more usual to find two or three infertility factors than to discover a single definite and outright proximate cause. Of this group of infertility factors, one of course may outweigh the others in importance.

Treatment of Blocked Tubes.—It has become usual to try the "œstrin" treatment of blocked tubes (Clauberg, 1938, and Moore-White at the Royal Free Hospital, 1940). Five milligrammes of œstradiol benzoate are given every five days for five injections, a start being made immediately after a menstrual period. The course is continued for two or three months. The tubes are then reinsufflated or injected with iodized oil. One investigator claims up to 50% of successful results; but at the clinic, in a small series of 12 cases, we have obtained only two successes, one being followed by pregnancy. This method is still inadequately tried and will take a few more years to evaluate; but it is worth a trial. It is said to be most successful when the obstruction is at the fimbriated end of the tube.

The further treatment of obstructed tubes is surgical. If the tubes are blocked at the cornual or uterine ends, it is better not to attempt any operative procedure. However, if the obstruction is at the fimbriated end, one may try salpingostomy if œstrin therapy has failed.

In England, Bonney (1937) claimed 18% of successes, and Green-Armytage reported four pregnancies in 22 cases (1937).

The most extensive figures come from America, where Greenhill collected the results of 818 plastic operations on the tubes. He found that one pregnancy resulted from every 15 operations; but of these pregnancies about one-third ended as abortions or were ectopic gestations. He concludes by writing: "I am not enthusiastic about plastic operations on the tubes to overcome sterility."

At the clinic we have performed only three salpingostomies, and one of the stomata was patent three months later. No pregnancies have resulted.

Treatment of Genital Hypoplasia.—For genital hypoplasia give œstradiol benzoate by intramuscular injection twice a week for a period of three to six months. Opinion about the dosage varies, but I use five milligrammes on each occasion. We had 36 cases of genital hypoplasia; in the majority enlargement followed œstradiol treatment, although in several no change occurred. To show how complicated sterility statistics become, let us dwell for a moment on these 36 patients with hypoplasia. Of nine of them, three either refused treatment or did not return after one injection; three had blocked tubes as well; two had husbands with aspermia; and one suffered from anovulation as well as hypoplasia. Out of the 27 patients remaining, six have become pregnant to date and more are likely to become so, as their treatment finished quite recently.

The Treatment of Anovulation.—We have given the serum gonadotropic hormone sold under the name of "Serogan" (British Drug Houses) in doses of 200 rat units twice a week for the first fourteen days of the menstrual cycle; success has been achieved in a small percentage of cases only. We have also tried the effect of a large dose of œstrin about ten days after the menstrual period. The aim of therapy is to make a follicle ripen and rupture; but the treatment is only occasionally successful.

The Treatment of Retroversion and Cervicitis.—I put retroversion and cervicitis together, as they so frequently occur as a clinical combination. Patients with retroversion need not be operated on at once unless they have dyspareunia also. If this complication is absent, they can be given a placebo for six months, such as thyreoid tablets. If they are not pregnant then, it is reasonable to operate. It is still essential to know that the male is efficient and that the tubes are patent before embarking on the operation. The role of cervicitis is problematical. Many patients in ordinary practice become pregnant in spite of cervicitis, and then one finds the occasional patient who conceives shortly after cauterization of the cervix, though she has previously had a long period of sterility. During the three years of the clinic's work we have found cauterization of the cervix a very useful procedure in making pregnancy possible.

Treatment of other Conditions.—One must always carefully assess the general health of the patient, and it is worth while adding vitamin *E* to the diet. What part it plays in the treatment of sterility in the human is as yet unsettled; it is certainly not a nostrum that cures every infertility factor, from aspermia to obstructed tubes. In the treatment of patients with the ordinary gynæcological diseases one proceeds as usual (myomectomy for fibroids, hymenectomy for rigid hymen *et cetera*).

Conclusion.

In conclusion I should like to stress the fact that nobody is more conscious than myself that one could study this subject over ten years and still be learning. My

purpose in issuing this preliminary report on the clinic after three years is to stimulate others to take an interest in the same work, so that the mere mention of the word "sterility" will bring about a clash of rival armies. At present all is apathy.

Acknowledgements.

My great thanks are due to Sister Giles and Sister Kennedy for their work in the sterility clinic; to Miss Carr, our almoner; and to the pathological staff, especially Dr. Mackey and our efficient technician Mr. Frost.

Summary.

The following factors have been considered with regard to the investigation of any sterile couple:

1. Sterility is more often due to a number of causes than to one absolute cause.
2. The male is responsible for about 20% of cases of sterility.
3. It is essential to examine a specimen of semen, for which a technique of collection *et cetera* is given. The man may look robust and still have aspermia.
4. It is essential to examine the patency of the tubes in the female, as they are obstructed in about 25% of cases.
5. Reasons are given for preferring iodized oil to gas in making tests of tubal patency.
6. Genital hypoplasia is commonly found in patients suffering from sterility.
7. Cauterization of the cervix is a very successful procedure in the treatment of sterility, although many patients seen in ordinary gynæcological practice have no difficulty in becoming pregnant in spite of the presence of cervicitis.
8. Thyreoid extract is still useful in the treatment of sterility.
9. Anovulatory menstruation is not very common (3% or 4% of cases) and its treatment is unsatisfactory.
10. The treatment of the commoner infertility factors is outlined.

Appendix.

Results at the Women's Hospital.

We had a total of 29 pregnancies out of 119 cases in which pregnancy was to be anticipated. This represents a successful result in about one out of four cases. This compares with average figures from sterility clinics in other parts of the world, and also indicates that there are still many unfathomed problems in the subject of infertile marriage.

A number of patients adopted babies after investigation had shown that they were most unlikely to have an infant themselves.

A List of the Successful Forms of Treatment.

It is of interest to tabulate the measures that were adopted in these 29 cases before the patients became pregnant. They are as follows:

	Number of Cases.
Cauterization of cervix and salpingography	6
Use of thyreoid extract and salpingography	6
Salpingography only	5
Use of thyreoid extract without salpingography	2
Œstradiol benzoate injections and salpingography	2
Passage of a sound only	2
Hymenectomy and salpingography	1
Internal shortening and salpingography	1
Internal shortening, cauterization and salpingography	1
Myomectomy and salpingography	1
Section and freeing of adhesions	1
Extramarital intercourse[1] (in a case of male sterility)	1
Total	29

Follow-Up Notes on the Pregnant Patients.

It is well known that the first pregnancy following a period of sterility is likely to terminate in a miscarriage. De Lee states that the incidence of abortions in pregnancies subsequent to the first is much smaller. The appended tabulation shows what happened to our patients.

	Number of Patients.
No record (known to be pregnant, but did not reply to two letters)	9
Uneventfully delivered of a live infant	7
Threatened to miscarry and eventually bore live infants	3
Miscarried	3
Ectopic pregnancy	1
Placenta prævia and Cæsarean section	1
Died of cerebral hæmorrhage before term	1
Pregnancies normal so far	4
Total	29

[1] The treatment adopted by this patient was not recommended to her by the clinic.

Reviews.

OBSTETRICS IN GENERAL PRACTICE.

THE name of J. P. Greenhill is well known as the co-editor (with De Lee) of the "Year Book of Obstetrics and Gynecology". His latest work, "Obstetrics in General Practice", is not, as he indicates in his preface, intended to compete with the various standard text-books on obstetrics, but is in every sense a practical book written to meet the needs of the general practitioner.[1] There is no doubt that in this volume Greenhill has achieved his purpose with singular success.

Almost all the recent work of proven value is incorporated in the text, and a few examples may be especially mentioned. Therapy by endocrine preparations, for instance, is recommended only when there is a valid and physiological reason for such a line of treatment. The value of lochial cultures in the treatment of post-abortional and puerperal sepsis by the sulphonamides is rightly emphasized. Ureteral catheterization and drainage for intractable pyelitis of pregnancy is recommended—a measure which, though not within the scope of the general practitioner's work, is probably insufficiently used. The role of the sulphonamides in the treatment of pyelitis of pregnancy is also well discussed.

The chapter on the toxæmias of pregnancy commences with the concise and clinically helpful classification recommended by the American Committee on Maternal Health (1939). Hypertensive disease (essential hypertension) complicating pregnancy is shown as a separate clinical entity, distinct from the hypertension of both preeclampsia and renal disease. This distinction is a most important one and is not, as a rule, sufficiently stressed. The work of Strauss on water retention in the pure toxæmias of pregnancy is reflected in the discussion on the treatment of these conditions.

Similarly, the excellent work of Thoms, Caldwell and Moloy on the structure of the female pelvis is extensively quoted. The growing appreciation of the frequency of the android (or male) type of pelvis amongst white women should help considerably in the anticipation and prevention of some of the difficulties for which this particular abnormality is often responsible. In this connexion the significance of the posterior sagittal diameter of the pelvic outlet receives the attention it deserves. Nevertheless, it is pleasing to note that the female pelvis is now regarded as having distinctive structural characteristics, and the detection of variations from the normal is no longer dependent on the consideration of certain accepted measurements.

Commonsense observations and advice are the keynote in the section dealing with the actual management of labour, and improvizations for domiciliary practice are described in detail. The management of breech presentations is less satisfactorily described, for the author, although commenting on the high fœtal mortality for breech extractions, devotes the whole of the chapter to a description of this manœuvre, to the exclusion of any proper account of the accepted methods of conducting a spontaneous delivery.

The use of cystography in the diagnosis of *placenta prævia* is well illustrated, but has yet to prove its value or even its necessity. Various alternative methods of treating *placenta prævia* are described with a wealth of practical detail; but many would disagree with the author's advocacy of a lower segment rather than a classical Cæsarean section for central or marginal *placenta prævia*. There are excellent chapters on the minor ailments of pregnancy, the use of oxytocic drugs, obstetric radiography, applied endocrinology and induction of labour.

Post-partum exercises are described and illustrated, but the comprehensive scheme of antenatal physiotherapy

[1] "Obstetrics in General Practice", by J. P. Greenhill, B.S., M.D., F.A.C.S.; 1940. Chicago: The Year Book Publishers Incorporated. Large crown 8vo, pp. 448, with illustrations. Price: $3.50 net.

elaborated by Sister Randell and J. S. Fairbairn at Saint Thomas's Hospital, London, has apparently not yet made its mark on the American clinics.

The methods of relieving pain during childbirth, including local and infiltration anæsthesia, are adequately described, and the author sounds a timely warning against oversedation. "There is no drug", he states, "or combination of drugs which can relieve all the pains of labour with complete safety"—an observation which the laity, as well as the practitioner, would do well to appreciate.

The chapter on *asphyxia neonatorum* is one of the best in the book; the use of the mucus aspirator is described in detail and the value of lobeline hydrochloride as a respiratory stimulant receives the emphasis it deserves.

The volume as a whole is excellently produced; there are a number of entirely new illustrations and the text is well set out and indexed. This book is likely to prove the most helpful contribution to obstetric literature since Professor F. J. Browne published the first edition of his "Antenatal and Postnatal Care".

WAR NEUROSES.

"THE Neuroses in War" opens with a survey of the literature which provides the reader with a helpful orientation in regard to ætiology, symptomatology and treatment of war neuroses.[1] Of the eleven contributors all but two are on the staff of the Tavistock Clinic. Nevertheless, they display refreshingly eclectic viewpoints in their approaches to the various problems under discussion. The chapter dealing with psychosomatic disorders might well have been amplified for the benefit of those who have to make the difficult decision as to the constitutional and acquired physical and psychological components of such conditions as the effort syndrome and certain gastro-intestinal disorders. There is an excellent section on the "war of nerves" and civilian morale which contains much sound advice. This, however, was written before the *Blitzkrieg* had assumed its present proportions, and doubtless will be revised in the light of more recent experience. There is need for a section on the psychiatric and sociological problems raised by the mass evacuation of children and the general disruption of home life.

The book should be of immense value to any medical man, whether specialist or general practitioner, who has to deal with "nerve" casualties in the fighting services and amongst civilians. Many of the chapters will be read with interest and benefit by lay war workers.

Appendices contain extensive extracts from the report of the War Office Committee on "shellshock", 1922, a summary of the provisions made for the treatment of civilian psychoneurotic casualties and on the use of sedative drugs in psychiatric practice.

MODERN DRUGS IN GENERAL PRACTICE.

IN "Modern Drugs in General Practice" Dr. Ethel Browning has succeeded to a remarkable extent in sifting the chaff from the bran of drug manufacture and has placed before the busy practitioner a comprehensive review of new drugs that have proved themselves of value.[2]

The reader is struck by the fact that there are few drugs that cannot now be either synthesized or closely imitated by the manufacturer. The pharmacology of each drug is briefly and simply described.

The book opens with a full description of the sulphonamides and, although the essential difference between those that break down into sulphanilamide, for example, "Prontosil", and those that are excreted unchanged, for example, sulphapyridine, is not clearly explained, the details of treatment by the various drugs of the group are such as to indicate a wide experience of their use by the author, who issues a timely warning about their indiscriminate employment when little result and possible damage can be expected.

Gold therapy, which has become so widespread of recent years, is assessed at its true value, the author pointing out the great difficulty of giving accurate criteria of cure or marked improvement in tuberculosis, whilst "its use in rheumatoid arthritis is an outstanding example of empiricism in drug therapy".

Cardiac drugs are fully discussed and the modern preference for whole-leaf preparations of digitalis in the form of pills as efficient and cheap is rightly emphasized. The author's clinical experience is again evidenced when she points out the ridiculously small doses of "Coramine" that are usually given. "Sedatives and Hypnotics" could be curtailed with advantage. Chapters on gastro-intestinal remedies, diuretics and urinary antiseptics and modern disinfectants conclude what is a most useful book and one that brings into strong relief the old aphorism:

> Be not the first by whom the new is tried,
> Nor yet the last to cast the old aside.

PSYCHOLOGY AND PSYCHOTHERAPY.

THE fourth edition of "Psychology and Psychotherapy", by Dr. William Brown, has a war-time flavour.[1] Not merely does he deal with his experiences of the last war in treating large numbers of soldiers suffering from nervous disorders, but also with such major problems as propaganda and the responsibility of the mass psychology underlying aggression. Of necessity it would be impossible to compress all the available information into the limited mould of a comparatively small book. The author must be congratulated on his handling of the problem within the limits of his main thesis.

Dr. Brown pays respectful homage to the genius of Freud, but almost apologetically agrees to differ on such matters as the preeminence of sex as a cause of conflict. The reader must surely pray for the swift arrival of that happy time when the names of our psychological heroes can be kept for moments of historical adulation. How long must even small volumes designed for the medical student and general reader be cumbered with the endless debate as to what Freud thought or Adler intended? So many of their ideas have now passed into the common stock of our ideology, their repetition savours of tradition rather than helpful argument. Perhaps this hang-over from the past is responsible for a very serious omission on the part of the author. He devotes chapters to the unconscious, the theory of dreams, and the emotions, but does not even mention the data acquired by the use of shock therapy and narcotherapy. Those who have seen the extraordinary changes which sometimes follow even one injection of a convulsant will not need to be reminded that any purely psychological theory of emotion must take it into account. From the therapeutic point of view the omission is even more serious. If our army medical authorities show a similar neglect for the discoveries of the last few years, we might wonder whether our powers of scientific adaptation are not seriously on the decline. Let us hope that if they use this work as a text-book, they will critically use the good, but make suitable additions as to the uses of convulsant and sleep therapy.

There is a chapter on psychology and the adolescent which draws attention to the paramount need for investigation of all delinquents as a preliminary to treatment in preference to the older method of more or less indiscriminate punishment.

Perhaps the happiest chapter is that which deals with the problems of later life. Actually it is an address given to the "Alliance of Honour". The author points out the imperative need for us to learn to sublimate our activities. Even after passing the prime of life there is danger in looking back.

> I need not say any more about the habit of looking wistfully back like Lot's wife to the past, and becoming petrified and fossilized in that way. No one, whatever his age, becomes a fossil if he looks forward with enthusiasm and keen interest to the future of his own life and of the world around him.

He discusses the fear of death and the dangers which arise if we commence to adopt a cynical attitude to life.

Dr. Brown has much to say of hypnotism as a remedial measure, particularly in the war neuroses. He gives his own technique, which was perfected during the last great war.

Space will not permit more than a passing reference to the section on war and peace. The existence of widespread crooked thinking and aggressive instincts calls for psychological training in our politicians. In the past there has been a lamentable lack of such elementary foresight.

The last chapter concerns psychical research and personal experiences of media. That the results are inconclusive will not astonish the seeker after truth.

In spite of its limitations, the book is well worth a perusal. Should it achieve another edition, a broader treatment on the lines already indicated would undoubtedly increase its utility.

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[1] "The Neuroses in War", by several authors, under the editorship of E. Miller, M.A., M.R.C.P., D.P.M., with a concluding chapter by H. Crichton-Miller, M.D., F.R.C.P.; 1940. London: Macmillan and Company Limited. Demy 8vo, pp. 262. Price: 10s. 6d. net.

[2] "Modern Drugs in General Practice", by E. Browning, M.D., Ch.B.; 1940. London: Edward Arnold and Company. Demy 8vo, pp. 242. Price: 10s. 6d. net.

[1] "Psychology and Psychotherapy", by W. Brown, D.M., D.Sc., F.R.C.P.; Fourth Edition; 1940. London: Edward Arnold and Company. Demy 8vo, pp. 268. Price: 12s. 6d. net.

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SJØGREN'S SYNDROME.

AT the annual meeting of the Ophthalmological Society of Australia (British Medical Association) held in Sydney last October, J. Bruce Hamilton, of Hobart, presented an important paper on *keratitis sicca*, in which he made special reference to Sjøgren's syndrome.[1] The literature on this subject is so scanty and the condition known as Sjøgren's syndrome has until recently presented such a hopeless therapeutic problem, that its clinical manifestations, the current views on its ætiology and the methods used in its treatment should be more widely known outside ophthalmological circles. The chief characteristic of Sjøgren's syndrome is dryness of the eye, and Duke-Elder has shown that dryness may be due to a congenital defect, that it may be caused by injury, that it may follow excision of the lachrymal gland and that it may occur spontaneously in women after the climacteric. Hamilton refers to a fifth group described by Riddell as associated with hereditary or acquired anhydrosis; this he accepts, but he thinks that yet another group, described by Mulock Hower, and always associated with advanced rheumatoid arthritis, blends with the group described by Duke-Elder as occurring spontaneously in women after the climacteric. It is to this last-mentioned group that Sjøgren's syndrome belongs.

Sjøgren's syndrome, in addition to dryness of the eyes, has as its distinctive features anhydrosis and a swelling of the salivary glands with dryness of the mouth; articular changes are also present. Apparently emphasis must be laid on the fact that this syndrome occurs chiefly in women at the menopause. Hamilton points out that although Mulock Hower and others had drawn attention to the association of keratitis and arthritis, it was not until Sjøgren published his monograph on *keratitis sicca* in 1933 that the syndrome now bearing his name was "elucidated". This condition of the eye is described by Hamilton in the following words: "There is stringy secretion in the lower fornices, not washed on to the lid margins by the tears, because there are none. There is a hazy cornea with multiple erosions, due to desiccation, and there may be vesicles on the cornea which rupture and form epithelial tags that are whirled into filaments by blinking. This condition is commonly called filamentary or arthritic keratitis. There is often diminished corneal sensation to light touch with cotton wool." Schirmer's test is used to confirm the absence of lachrymal secretion. In this test the amount of secretion is determined by measurement of the length of a strip of filter paper or litmus paper saturated in a given time when the paper is bent and hooked over the lower punctum. Hamilton is insistent on the value of this test and holds that its use should always be combined with a slit lamp examination of the stained cornea. He then goes on to state that the corneal conditions may be of two separate types. In one the toxic agent acts on the lachrymal gland, causing a diminished lachrymal secretion, and this produces a dry cornea with multiple erosions (a secondary keratitis); in the second the postulated toxin gives rise to a primary keratitis, and in these circumstances there is a vesicular condition or a filamentary condition or both. In the former, which we shall call the first type, there is not much pain, the condition is continuous and the secondary lesions consist of multiple corneal erosions; in this type treatment is effective. In the second type the primary lesions, vesicular and filamentary keratitis, pain is present and relapses occur; no treatment is effective, but the condition subsides spontaneously after each exacerbation. Any deterioration of vision is due entirely to destruction of the epithelial surface of the cornea. Dryness of the mouth and swelling of the salivary glands are not always recorded; one of Hamilton's patients had a large swelling of the right parotid gland and another had four attacks of parotitis in eleven years. The anhydrosis is not always present and may be localized. Arthritis, Hamilton writes, was present in thirteen of the nineteen cases of the syndrome described by Sjøgren. Treatment consists in the provision of artificial tears. The canaliculi are first of all permanently occluded by electrocoagulation and then "tears" consisting of 10% blood serum in Ringer's solution are instilled. Difficulty was experienced in the preservation of the artificial tears; but this was overcome by Hamilton, who added chloretone to the solution in the strength of one grain to the fluid ounce. At first the drops are used every four hours, but the interval can gradually be increased until finally instillation twice a day will suffice in most instances. Hamilton states that the use of artificial tears is of little benefit in the vesicular or filamentary types of keratitis.

The success that has attended the treatment of keratitis due to desiccation is of extraordinary interest and reflects credit on all who have helped to bring it to its present state of efficiency. Beetham and, later, Rucher who emphasized the need for destruction of the canaliculi by electrocoagulation, Rucher who prepared artificial tears from the patient's blood serum by adding it to Ringer's solution, and Hamilton who found a way to prevent deterioration of the "tears" so that the method might be used over a long period of time, have accomplished a

[1] Transactions of the Ophthalmological Society of Australia (British Medical Association), Volume II, 1940.

great deal. What remains obscure, however, is the ætiology of the condition. Apparently the only constant finding, as already pointed out, is the dryness of the eyes. The other distinguishing features—dryness of the skin, dryness of the mouth and arthritis—are not invariably present. In other words, *keratitis sicca* is the only invariable manifestation. But even here it is wise to ask whether the corneal erosions that follow a prolonged absence of lachrymal secretion are the result of inflammation of the cornea. In his monograph published in the German language Sjøgren reproduces photomicrographs of different sections of the eye, and it is to be hoped that a translation with illustrations will before long be made available to Australian readers. Hamilton did not discuss this point in his paper, which was concerned more with the clinical aspect. When Hamilton uses the word toxin as giving rise to the two types of the syndrome, he clearly uses it in its widest sense as indicating an active agent and not necessarily in the strict sense of a bacterial toxin. If we concluded that a non-bacterial agent might cause interference with the activity of the lachrymal glands (the first type), the vesicular and inflammatory condition (the second type) could be regarded as due to an added infection. If the first type is caused by a bacterial toxin, then the second would probably be a later stage of the first. There is a third possibility that the two are not ætiologically connected in any way, but merely have some clinical features in common; this can almost certainly be rejected. Several possible causes have to be considered. Hamilton states that Sjøgren could come to no definite conclusion, but regarded the condition as an inflammation of unknown ætiology. Beetham thought that destruction of sympathetic action would account for all the symptoms, but Hamilton is emphatic in his rejection of this view. He thinks that the condition is due to an attack on the gland by the same process that produces the arthritis. He also, on account of the association of the condition with the menopause, mentions the possibility of the existence of an endocrine factor. If this is allowed, and it seems reasonable, then some concomitant error in metabolism may also be postulated. Conjecture, however, is of little use. Further research in this small field will alone reveal the cause, and then we shall know whether the present use of the term Sjøgren's syndrome is justified.

Current Comment.

DISCHARGE FROM THE NIPPLE.

IN their book on tumours of the breast G. L. Cheatle and M. Cutler divide discharges from the nipple into four groups; the discharge may consist of blood, of serum, of thick greenish fluid or of white fluid. Most breasts, they state, from which a discharge of blood takes place, are affected by a benign papilloma; more rarely hæmorrhage from the nipple is caused by a duct carcinoma, and most rarely from a carcinoma the primary epithelial neoplasia of which arises in the terminal ducts and their acini. A discharge of blood from the nipple may be caused by trauma. A spontaneous intermittent and intractable serous discharge from the nipple may, according to Cheatle and Cutler, be associated with slight infective processes of the ducts in the nipple or with carcinoma. A thick greenish discharge from the nipple is usually not spontaneous. It is often bilateral, nearly always occurs in young married women who have borne children, and is often discovered by the patient who presses her breast in an attempt to relieve discomfort in the gland. It is the result of stagnating secretion in the dilated ducts after lactation. The solid contents of a whitish discharge from the nipple may be either milk, leucocytes from pus or malignant epithelial cells. In an article published in *The Journal of the American Medical Association* of November 17, 1923, on the significance of a sero-hæmorrhagic or hæmorrhagic discharge from the nipple, E. M. Miller and Dean Lewis pointed out that clinicians did not agree on the significance of these discharges. They quoted the views of various well-known authors in support of this statement, and after all these years additions could no doubt be easily made to their list. But if we accept the classification of Cheatle and Cutler, and probably most clinicians would be ready to do so, it will be clear that a tumour will not in every case be palpable. When a tumour cannot readily be felt diagnosis may be far from simple, and even when the clinician is tolerably certain of his diagnosis he will often find it difficult to decide what form of treatment he should advise. The greatest difficulty will be experienced in the differentiation of malignant from non-malignant lesions. In their important paper, which will well repay study today, Miller and Lewis dealt with forty cases. They found that the proportion of benign and malignant lesions associated with discharge was about the same. Interesting though their findings were, they cannot be described in detail; but it may be pointed out that about half the benign tumours associated with discharge were papillomatous and occurred either as duct papillomata or as papillary ingrowths in chronic cystic mastitis. Miller and Lewis also insisted that the presence of a discharge from the nipple of a non-lactating breast was evidence of a pathological lesion, but that the diagnosis had to be made on the usual signs and symptoms associated with benign and malignant lesions—the discharge could not be regarded as of any great significance in differential diagnosis.

Paul R. Hinchey has made a clinical and pathological study of sixty-seven patients who had a discharge from the nipple.[1] The cases occurred at the Massachusetts General Hospital and the Boston Clinic. The sixty-seven patients represent 8·5% of 1,051 patients seen at the two clinics. All types of discharge were included in the study; 36 discharges were bloody, 16 were serous, five were milky, two were watery and eight were grouped under a heading "miscellaneous". Eight patients had a bilateral discharge. Carcinoma (not including Paget's disease) was the cause of the discharge in 22 instances, Paget's disease in two, chronic cystic mastitis in 18, duct papilloma in seven, hormonal dysfunction in seven, inflammatory cysts in three, fibrous mastitis in two; in six instances the cause is stated to have been "miscellaneous". The discussion on these several groups is both interesting and instructive. The 24 cases in which carcinoma (including Paget's disease) was the cause represented 3·2% of 742 cancers of the breast. The average age of the patients was fifty years. Ten women had a bloody and 22 a non-sanguineous discharge. In 17 cases the discharge is described as having been significant. When these cases were studied four possible sources of diagnostic error were apparent: (*a*) the youth of the patient, (*b*) the fact that the discharge was not bloody, (*c*) the fact that the discharge was the first symptom, and (*d*) the absence of a palpable mass in the breast. Two young women, thirty-two and twenty-six years of age, had bloody discharge from the nipple, painful breasts, but no mass when they were first seen. The breast was described as "shotty". This shottiness or nodularity has been described by Cutler (*The Journal of the American Medical Association*, December 24, 1932) as the clinical sign most commonly associated with Schimmelbusch's disease, which is a "serious menace to the patient". Schimmelbusch's disease is characterized by multiple cysts on which a papillomatous process has supervened and in which epithelial neoplasia, although atypical, is still confined within the

[1] *Annals of Surgery*, March, 1941.

ducts and acini. Cutler insisted that nodularity was always an indication for exploratory operation. Turning again to the study of Hinchey's 17 patients in the carcinoma group, we find that he thinks that possibly there has been undue emphasis on the bloody nature of the discharge. More than half the patients in this group of 17 had a discharge that was not bloody. Three of four who had a serous discharge had assigned to their breast condition a diagnosis of chronic cystic mastitis, in spite of the presence of a mass in the breast. Hinchey suggests, as is most likely, that the absence of blood from the discharge persuaded the observers that the lesion was benign. The clinical lesson is obvious. It is also obvious in regard to 11 of the 17 women whose nipple discharge was the first indication of pathological change in the breast. Seven of these women had a tumour when they first sought advice at the clinics already mentioned, and on an average the appearance of the discharge preceded detection of the mass by twelve months. "Early cancer of the breast is more commonly associated with a discharge from the nipple than any other sign except the presence of a lump." Four of the 17 women had no palpable tumour when they were first examined, and three of them had a bloody discharge. Hinchey refers to Wainwright's statement and adds that he agrees that the entire breast should be removed when bleeding occurs from the nipple and no localized focus is clinically demonstrable.

There were 18 cases of chronic cystic mastitis; seven of the women had a bloody, four a sero-sanguineous, four a serous, one a milky, one a greenish and one a brownish discharge. The average age was forty-four years. In ten cases intraductal papillary epithelial hyperplasia was found; in nine of the ten the discharge was stained with blood. In this group diagnosis will be most difficult. Hinchey's conclusion is that epithelial hyperplasia will be found in the majority of nodular breasts which have a discharge from the nipple, particularly if the discharge contains blood. He adds that "the disposition of this group will depend upon the surgeon's attitude towards the life history of such epithelial activity". This indefinite, almost hesitant, conclusion is in peculiar contrast to that regarding nipple bleeding without a demonstrable local focus in which Hinchey thinks that the entire breast should be removed. He certainly does state that whatever concessions one may make to the general proposition that cystic disease is not precancerous, marked epithelial growth in the breasts of elderly women must occasion alarm. The question is one of diagnosis, and the same may be said of duct papilloma, which is held by some to be as frequent a cause of bloody nipple discharge as carcinoma. It is important at this stage to remember that duct papilloma often becomes malignant. Adair is quoted by Hinchey as stating that ten or twelve years are required for carcinoma to supervene on duct papilloma.

Several points in the diagnosis of discharges from the nipple will be clear from the foregoing. Mention must also be made, however, of three diagnostic aids listed by Hinchey. In the first place the presence of a small lesion, such as a papilloma, is occasionally demonstrated when pressure is made over a segment of the areola and discharge is expressed from the nipple. Secondly, transillumination will distinguish between a solid tumour and one containing fluid, and Hinchey states that it will often reveal papillomata that may be multiple. The third diagnostic aid is mammography. This consists in the insertion of a fine cannula into the orifices of the ducts and of their distension with a contrast medium, after which stereoscopic pictures are taken. Readers who are interested in this form of investigation will find it described by N. F. Hicken and others in *Archives of Surgery*, Volume XXV, 1937, at page 1079, and in *The Journal of the American Medical Association* of March 13, 1937, at page 864. Hinchey's experience of the method has been limited to a few cases; from the very few references that are made to it in the literature, most clinicians will conclude either that its value is doubtful or that its performance is unusually difficult.

The all-important question of treatment comes last. Hinchey states that no controversy need take place over cases in which both tumour and discharge are present, since the presence of a tumour is alone an indication for surgery. At the same time "a bloody discharge should not stampede the surgeon into performing a radical mastectomy". The difficult cases are those in which a discharge is present but no mass. There are three courses open to the surgeon: the first is radical mastectomy, the second is observation, the third is local excision. Those who would perform total mastectomy in the presence of a bloody discharge have an argument difficult to answer when they state that even if the undiscovered source of the discharge is not malignant, it is very likely to be precancerous. Hinchey describes five groups of patients with nipple discharge and no tumour for whom local removal may supplant observation and mastectomy. They are: (*a*) those who have positive findings on transillumination, (*b*) those in whom the pressure test produces positive results, (*c*) those who have localized nodularity in the breast, (*d*) those who have passed the menopause, (*e*) those in whom the origin of the bleeding cannot be determined. It should be pointed out that Hinchey dismisses radiation therapy with the statement that its value is not proven; he allows that hormone therapy may be useful in certain circumstances. Observation must be adopted with caution and not by the inexperienced in these matters.

Hinchey's contribution is timely and practical. He set out to stress the importance of nipple discharge as a sign which should make the observer search for an actual carcinoma or a precancerous lesion in the affected breast. He has succeeded and clinicians generally will, or should, be grateful to him.

THE BLOOD SEDIMENTATION RATE.

THE estimation of the sedimentation rate of blood corpuscles is a valuable procedure, but confusion regarding the test still exists on three separate grounds. The first of these is the factors causing the alterations that occur. The second is the very variable clinical application of the test. The third is the lack of uniformity in the technique of performing the test.

The rate of corpuscular sedimentation depends on a number of factors. The most important seems to be the level of blood fibrinogen, which in turn may result from disturbances of liver function. Increase in serum globulins and lipoids also accelerates the sedimentation rate. The number and size of the red cells is of importance; the larger the cell, the more rapid the rate of fall. While it is true that in most pyrexial diseases the sedimentation rate is accelerated, it has recently been shown that fever is not the responsible factor. F. Fetter and T. G. Schnabel[1] determined the sedimentation rate in a number of patients who were being treated in the hypertherm for a variety of diseases, characterized both by accelerated and by normal rates. Among these were rheumatoid arthritis, chorea, gonococcal arthritis and ulcerative colitis. The temperatures produced in the patients ranged from 104° F. to 107° F. The rate of fall of the corpuscles was determined before, during and immediately after the fever therapy, and again the next day. No significant difference between these readings was found. It must be concluded, therefore, that although in most pyrexial diseases the blood sedimentation rate is accelerated, this change is due not to the fever, but to some other factor.

Precisely what this factor is in any one patient is usually not clear. Nor is the finding of a raised sedimentation rate usually of value to distinguish one disease from another. B. F. Massell[2] said to the American Academy of Pediatricians in 1938: "The sedimentation rate is a non-specific reaction. It may be accelerated by almost any process which causes increased tissue breakdown or injury", and among these he included tuberculosis, rheumatic fever or any acute arthritis, pelvic inflammation,

[1] *The American Journal of the Medical Sciences*, January, 1941.
[2] *The Journal of Pediatrics*, May, 1938.

tonsillitis, active syphilis, all acute infections, suppurative processes, thyreotoxicosis, burns and wounds, various tropical diseases, nephritis and malignant disease. Despite this, the test is a valuable one. Its chief virtue is its sensitivity, for there is general agreement that it indicates activity of a disease process when other signs, such as fever and leucocytosis, have ceased to be of value. Its greatest use, therefore, is in following the progress of chronic diseases, particularly rheumatism and tuberculosis, in which the physician's most powerful therapeutic weapon is bed rest while the disease remains active. It is worth noting that active tuberculosis or rheumatism occasionally fails to alter the suspension stability of the red cells. In simple chorea, indeed, this is the usual finding. The test may be of diagnostic value in distinguishing functional from organic disease, as Massell suggests; but it must be remembered that an accelerated rate may be caused by a relatively symptomless organic process that is quite apart from the suspected functional one. It has been suggested too that the estimation of corpuscular stability should be part of the routine examination of a supposedly healthy person. The finding of an accelerated rate would be an indication for a diligent search for organic disease. S. W. Cutler is reported by Massell to have used the test in this way, and to have discovered cases of latent tuberculosis, syphilis, pelvic inflammation and one case of carcinoma of the lung.

There remains the question of technique, and here the confusion is perhaps greatest. Some of the various methods are designed for research, some for routine use. Some measure the rate of fall over short intervals, some the time taken for the cells to fall a certain distance, some the distance fallen in a longer period, like one and two hours. The anticoagulant, the bore of the tube and the correction for the hæmatocrit reading and room temperature vary from method to method. To make confusion worse, many laboratories adopt modifications of the standard methods to suit their own convenience. The consequence is that accurate comparison between results obtained by various workers is well nigh impossible. It would be well if an organized attempt were made to standardize both the application and the technique of the test. The test, of course, will probably always remain subordinate to clinical methods because of its non-specific nature, and some physicians will find more use for it than others. But an attempt should be made to unify and simplify technique, so that each clinician will be able to understand what the other means by his results.

SUBACUTE BACTERIAL ENDOCARDITIS.

THE treatment of subacute bacterial endocarditis is, as we all know, most unsatisfactory and disappointing. In the past many therapeutic weapons were tried. Intravenously administered antiseptics, blood transfusions and immuno-transfusions and general supportive measures were found of little use. When the sulphonamide drugs were introduced they were tried with high hope, but still the disease was almost invariably fatal, and the attitude of many physicians was to accept the inevitable and be content to do their best to keep the patient comfortable and peaceful until the end came. Here and there, however, efforts are being made to find some means to make sulphonamide chemotherapy effective in this disease, and recently S. S. Lichtman and W. Bierman[1] have reviewed the newer developments. From a close search of the literature they point out that spontaneous recovery has sometimes occurred, but that quite the best rate reported has been 3% in any series of significant size. From the literature and from their own hospital records they have collected 200 cases in which the only treatment has been sulphonamide chemotherapy, with a recovery rate of 6%. They have quite rightly rejected four other isolated reports of single cases successfully treated, for these are obviously useless for computing death rates unless a record of fatal cases accompanies them. The authors then review the results reported in the literature or obtained by themselves and their hospital colleagues by the use of sulphonamide chemotherapy in conjunction with some other therapy designed to increase its effectiveness.

The first of the therapeutic agents is heparin, the use of which was first described by S. R. Kelson and P. D. White[1] in 1939. These workers pointed out that the causal organisms are in the vegetations, in a mass of fibrin and protected by a layer of fibrin and platelets. If they could prevent the formation of fresh clot on the surface of the vegetation, they felt there would be more chance that the sulphonamide drugs might reach the organisms, less risk of embolism and a greater chance that healing by fibrosis in the vegetations would occur. They therefore gave heparin diluted in saline solution by a continuous intravenous drip method at such a rate that the clotting time of the venous blood was increased to about one hour. This treatment they intended to continue for two weeks. In two cases embolism occurred during the treatment and death finally resulted. One further patient died during treatment. Three other patients were apparently cured. "Neither blind to the failures nor prematurely boastful of the apparent successes, we shall continue patiently to gather further experience . . ." is their concluding attitude. Since then the treatment has been continued. It has now been used in a total of 43 patients, and 11·5% have recovered.

The next ancillary treatment discussed is physically induced hyperthermia, by which a total of 24 patients have been treated and four recovered. The method is described in some detail by W. Bierman and G. Baehr.[2] They admit that the treatment must be carefully carried out and the patient closely watched. Discomfort and even distress may be caused to the patient, and sedatives are often needed. It is admitted that in the treatment of one patient the second induction of hyperthermia resulted in a shower of emboli and death. They insist that at least eight sessions of hyperthermia are necessary.

Finally, Lichtman and Bierman discuss chemotherapy in conjunction with hyperpyrexia induced by the intravenous injection of typhoid-paratyphoid vaccine. A total of 21 patients have been so treated, and five of them have recovered. Solomon, who is reported as the chief advocate of this mode of therapy, suggests that the introduction of a foreign protein to the blood stream not only produces a desirable hyperpyrexia, but stimulates immunological reactions, some of which are not clearly understood, but which may help to combat infection.

This is a heartening report, though the number of cases is not yet great enough for final conclusions. Certainly an attitude of unresisting despair in respect to subacute bacterial endocarditis can no longer be justified, if ever it could be. Such an attitude should never be applied to any disease that kills or cripples in the prime of life. It would seem that a major reason why chemotherapy alone has been a comparative failure in this disease is that the drugs have not permeated the infected but relatively avascular vegetations on the heart valves. They could sterilize the blood stream only to have it reinfected by organisms lurking in the vegetations. Heparin probably prevents progressive increase in this protective barrier. It seems possible that both heparin and hyperpyrexia may help to fragment these masses and lay them open to sterilization. If this is true, the risk of embolism must be greatly increased, as indeed it may have been in one of Bierman's patients and two of Kelson and White's. A more certain effect produced by hyperpyrexia is to increase the bacteriostatic effect of the sulphonamide drugs and perhaps to render them bactericidal. H. J. White[3] has demonstrated that *in vitro* the bacteriostatic power of sulphanilamide is about one hundred times greater at 39° C. than at 37·2° C., an observation that before long may be much more widely applied.

[1] *The Journal of the American Medical Association*, January 25, 1941.

[1] *The Journal of the American Medical Association*, November 4, 1939.
[2] *The Journal of the American Medical Association*, January 25, 1941.
[3] *The Journal of Bacteriology*, November, 1939.

With Solomon's suggestion of ill-understood immune reactions we are inclined to agree. Anything that aids a patient's own bactericidal powers is a logical partner to the sulphonamides, which are essentially bacteriostatic, and in this respect we would suggest that transfusions and immuno-transfusions be not discarded. It may be true that they alone effected cure in few cases of bacterial endocarditis. Already, however, they are proving their worth in many infective and toxæmic diseases that have resisted chemotherapy alone. While cardiac compensation remains they are almost free of risk and deserve trial in this as in other diseases. Similar trial is indicated of all these recent methods of treating subacute bacterial endocarditis. The disease is by no means conquered. These experiences are too new for final conclusions, but at least they have provided a glimmer of hope.

ACUTE RHEUMATISM AND RHEUMATOID ARTHRITIS.

A. H. BAGGENSTOSS AND E. F. ROSENBERG,[1] of the Mayo Clinic, have recently presented a most interesting report describing the cardiac lesions found in a series of autopsies performed on patients suffering from rheumatoid arthritis. From the clinical description given there is no reason at all to question the diagnosis, which in all cases had been made by a consultant of the Section on Arthritis of the Mayo Clinic. The age of onset of the disease in the series varied from seven years to sixty years, with an average of thirty-four. The age at death varied from fourteen to sixty-nine, averaging forty-one. The onset in most cases had been insidious, but explosive in a few, and in each instance the arthritis had been progressive for months or years, causing some degree of polyarticular deformity. The number of cases in the series was 25. In 20 of these cardiac lesions were present; 14 of the lesions were identical with those found in rheumatic fever, and the others were for the most part characteristic non-rheumatic lesions. In 10 of the 14 rheumatic lesions there was histological evidence that the inflammatory process was still active at the time of death. In seven of the 14 patients the cardiac lesion showed signs of its presence during life, and in seven the involvement of the heart was judged to be an important factor in causing death. In only two of these patients was there a previous history suggestive of rheumatic fever. The cardiac lesions comprised varying degrees of valvulitis, myocarditis and pericarditis.

This incidence of rheumatic carditis is of course very much higher than that found in all autopsies at the Mayo or any other general clinic, a rate which at the Mayo Clinic is judged to be about 5%. The report therefore provides additional evidence that there is a close relationship, as to both the ætiology and the nature of the disease process, between acute rheumatism and rheumatoid arthritis. This of course is not the first time such a suggestion has been made. It is specifically discussed by F. J. Poynton and Bernard Schlesinger in the latest edition of "Recent Advances in the Study of Rheumatism". The following facts, they point out, suggest an alliance between the two diseases. Endocarditis, so characteristic of acute rheumatism, is estimated to occur in 13% of patients suffering from rheumatoid arthritis, and in children pericarditis and occasionally chorea may occur. In some families it is found that one person has acute rheumatism and one rheumatoid arthritis. In both diseases there appear subcutaneous nodules of essentially similar structure, though in rheumatoid arthritis they tend to be more chronic, more fibrous and less cellular. The immunological reactions of the patients of both groups to streptococcal products are similar, though within both they vary considerably. Finally, in Germany and Scandinavia some workers claim that rheumatoid arthritis may follow as a sequel to acute rheumatism. Cases too occur that are half-way between the two diseases.

These resemblances are very striking indeed. Baggenstoss and Rosenberg suggest two reasons why cardiac lesions are less apparent in rheumatoid arthritis. The first is the greater relative inactivity of patients with this disease. The second is the usual later age of its onset. The age of onset of acute rheumatism, they claim, is before fifteen years in 90% of cases, and after this age in 90% of cases of rheumatoid arthritis. Even acute rheumatism in the adult we know tends to be articular rather than cardiac, while in the child the reverse applies. So it is rather to be expected that rheumatoid arthritis, a disease predominantly of adult life, will less often involve the heart.

A discussion of how these two diseases are related tends to be confined by the confused and conflicting results that have come from attempts to solve their ætiology. Two aspects of the problem seem to be particularly significant. The first is the difference in age incidence described above. It will be readily admitted that with age a marked difference comes over the body's response to bacterial infection, a change that is usually explained in terms of tissue sensitization by repeated experience of the invading organism. Tuberculosis provides the clearest example of the different response to a primary infection in a child and infection in a sensitized adult. In rheumatism, of course, the causal organism is not certainly known, but the bulk of evidence indicts the hæmolytic streptococcus, and a good deal of this evidence supports the view that the response to this organism is an allergic one. This brings us directly to the second observation significant to the present discussion; it is that in the laboratory animal two distinct types of sensitization to streptococci can be produced. The animal can be sensitized slowly by repeated minute intracutaneous injections of streptococci, such as might result in the human from a chronic septic focus. If, then, an intradermal injection of streptococcal products is given, the skin reaction is small, indurated, slow in developing and in resolving. If sensitization, however, is produced quickly by intravenous injection of soluble streptococcal protein, then intradermal injection of the same protein results in a skin response that is immediate, œdematous but not indurated, and transient. It may then be possible that rheumatic fever and rheumatoid arthritis represent the responses of tissues sensitized to different degrees by an identical causal organism, the response of the rapidly or partially sensitized tissues of the child on the one hand, and on the other the response of the adult, slowly and thoroughly sensitized. Such a conception, of course, cannot yet be proved and must be accepted only with considerable reserve. It at least is consistent with much experimental work and with the clinical observations that aroused this discussion.

[1] *Archives of Internal Medicine*, February, 1941.

TRAUMATIC RUPTURE OF THE SPLEEN.

AN interesting case of traumatic rupture of the spleen has been reported by Wallace Frank.[1] The patient was a young man of seventeen years, who was admitted to hospital complaining of abdominal discomfort and who gave a history of having suffered from malaria. Four days before his admission to hospital the patient was struck in the left upper quadrant of the abdomen while playing football. He was completely knocked out, his colour was pale and his pulse thready; he was carried from the field. On the next day he was well enough to travel to his home, a distance of 250 miles. Two days later he returned to the football field for practice, and during a scrimmage received another blow in the abdomen; he complained of severe pain. On the following day he had pain in the shoulder and abdominal discomfort. At operation the spleen, which was torn in two but otherwise normal, was removed. The clinical history alone is instructive; but Frank also wonders whether the malarial infection predisposed the spleen to rupture.

[1] *The Journal of the American Medical Association*, March 15, 1941.

Abstracts from Medical Literature.

SURGERY.

The Treatment of Tuberculosis of the Larynx by Injection.

JAMES R. ROBERTS (*The British Journal of Tuberculosis*, July-October, 1940) describes a simple method of treatment for the pain of tuberculosis of the larynx by the injection underneath the mucous membrane of seven or eight minims of a solution consisting of thirty minims of carbolic acid, two fluid drachms of glycerine and four fluid ounces of sterile water, with the addition immediately before use of some local anæsthetic. The results, he declares, are usually remarkable and the alleviation of suffering produced is very great. The needle is introduced through the hyothyreoid membrane in the thyreoid notch and then directed downwards, laterally and backwards behind the lamina of the thyreoid cartilage for about half an inch till its point is in the submucous tissue in proximity to the ventricle of the larynx, when the fluid is quickly injected and the needle withdrawn. The other side of the larynx is injected one or two days later. Several injections are required on each side. An alternative method of injection for use when there is involvement of the laryngeal aperture or ventricular folds by the disease is to insert the needle through the skin above the hyoid bone and to deliver the solution into the submucous tissue at the junction of the epiglottis and tongue on either side. A finger passed over the tongue acts as a guide to prevent the needle from piercing the mucous membrane.

Transverse Incision for Abdominal Operations.

LEONID S. CHERNEY (*Surgery, Gynecology and Obstetrics*, January, 1941) describes a transverse abdominal incision designed to give a greater operative field than the vertical incision and to avoid the fold of fat in obese persons. It is claimed that this incision gives better access to the rectum and sigmoid in the male as well as to the internal genitals in the female. It is not recommended for large pelvic tumours. The skin incision is the same as Pfannenstiel's; the edges of the rectus sheath are nicked and a transverse incision is made, which is continued to expose the recti in the middle and the peritoneum on each side. The lower flap of rectus sheath is dissected off the muscle down to the pubic bones. The pyramidalis muscles are dissected off the recti. The two recti are cut across at their insertion and reflected up. The peritoneum is then exposed and may be opened where desired.

Gastro-Duodenal Aspiration.

M. EINHORN (*Surgery, Gynecology and Obstetrics*, January, 1941) describes an instrument designed for carrying on lavage simultaneously in stomach and duodenum. The principal tube is 50 inches in length and is divided in its entire length into two distinct canals. One ends two and a half inches from the tip of the instrument; the other extends to the very tip and is used for the duodenum; the shorter canal has its openings not lower than seven inches from the tip, the remainder being filled with lead. Marks on the tube are at 19 inches (the distance from the nares to the cardia), at 30 inches (the distance from the nares to the pylorus), and a third 36½ inches from the tip, so that the terminal portion (six and a half inches) may enter the duodenum. The outlet bifurcates into two channels. The author discounts the use of single channel tubes as likely to allow transference of contents from duodenum to stomach and *vice versa*. The tube is inserted through the nose and a period of twenty to twenty-five minutes is taken to insert it. The patient is turned on the right side as soon as the first mark is reached. That part of the tube has reached its proper position may be established by observations of differences on the specimen from each canal. Coloured material injected into the duodenal canal should not return with the gastric contents; as a last resort X-ray examination may be used to verify the position. The author recommends this instrument for pre-operative and post-operative gastric intestinal treatment when drainage and tubal feeding are required. The advantages are that decompression is effective and that jejunal feedings and gastric drainage can be carried out simultaneously. The weighted tip facilitates passage through the cardiac and pyloric openings and helps to keep the lower portion from slipping back into the stomach.

The Administration of Oxygen after Thyreoidectomy.

J. G. SCHNEDORF, R. D. MCCLURE AND A. B. MCGRAW (*Surgery, Gynecology and Obstetrics*, January, 1941) advocate the administration of oxygen to patients after thyreoid operations. The tent method is used. The authors found the oxygen saturation of arterial blood lowered in 50% of their series one hour after operation. Hyperthyreoidism is associated with increased consumption of oxygen. Increased pulse rate is regarded as an indication for the use of oxygen, which exerts a sedative effect, facilitates pulmonary aeration and so reduces respiration and pulse rates.

The Treatment of Brain Injuries.

WILFRED PICKLES (*The New England Journal of Medicine*, January 23, 1941) insists that the treatment of head injuries is primarily the treatment of brain damage. The degrees of damage merge, but may be divided into concussion, congestion and contusion, with their varying signs and symptoms. Shock is usually an additional factor. In the Rhode Island Hospital the aim is to get the patient at rest with a normal intracranial pressure as soon as possible. Shock treatment is instituted and no examination is made until the period of shock has passed. When this occurs, a careful estimate of brain damage is made by a thorough examination of the patient and of the wound. An hourly record of the pulse, blood pressure and the fluid intake and output is made. The patient is examined also by a neurologist and an ophthalmologist. Lumbar puncture is next done and the fluid is examined microscopically. If the pressure is increased it is usually brought down to normal, but if grossly increased it is reduced by half only. Concentrated glucose solution is given carefully by the intravenous method, and intramuscular injections of magnesium sulphate are also given. If all these methods fail, subtemporal decompression is performed. According to the author, the results of subtemporal decompression are disappointing, except when subdural hæmatoma is present. Depressed fractures are treated by operation. In compound fractures thorough *débridement* and flushing of the wound with warm saline solution are recommended. Sulphapyridine is used if infection occurs. Five hundred and fifty-four patients were treated for head injuries in five and a half years. The operative incidence was 6% and operative mortality 26%; the gross mortality was approximately 5%.

Loss of Protein in Burns.

ROBERT ELMAN (*The Journal of the American Medical Association*, January 18, 1941) states that the loss of protein is an important and serious effect of severe cutaneous burns. This protein consists of tissue and plasma protein. He suggests that 20 cubic centimetres of blood and 10 cubic centimetres of plasma per kilogram of body weight, repeated each day for four days, should be given to patients with severe burns. Observations of the effect of injected amino-acids on the plasma protein are being made at present. Acacia, used as a substitute for plasma, is fairly effective, but may be a liver poison. The value of adrenal cortex has been questionable in the cases seen by the author. To prevent protein loss from the burned area the author uses a 10% solution of silver nitrate and a 20% solution of tannic acid. A diet rich in protein to replace plasma protein is advocated.

The Control of Pain in Terminal Cancer.

LYNDON E. LEE (*The Journal of the American Medical Association*, January 18, 1941) emphasizes the control of pain in terminal cancer by means other than the drugs generally used for this purpose. To combat irritation caused by the carcinoma 7% benzocaine ointment is used. For patients with a life expectancy of over three months, actual pain should be treated by good nursing, radiological and surgical measures. Non-narcotic analgesics should be given first, to the limit of effectiveness. When these are ineffective, the minimal analgesic dose of a narcotic, supplemented by barbiturates, is desirable. Freezing therapy is still in the experimental stage. Hitherto unknown phenanthrene derivatives have been subject to investigation, and methyl dihydromorphinone appears promising.

Gastroscopy.

H. TAYLOR (*The Lancet*, February 1, 1941) presents an analysis of 350 cases investigated by the flexible gastroscope at the London Hospital during a four-year period. The article is well illustrated by coloured plates. The limitations placed upon the research worker with instruments by the fact that his subjects are human beings make progress slow, and gastroscopy is used only after other diagnostic methods have proved inconclusive and when constant recurrence of symptoms or incomplete relief suggests that more exact investigation is needed. The author points out the necessity for a careful drawing of the findings at each examination and for the taking of a second view after an interval of three weeks in suspected malignant disease. Failure

of an ulcer to change under treatment is regarded as an indication of malignant degeneration. The author suggests that achlorhydria bears the same relation to cancer of the stomach that axillary metastases bear to cancer of the breast, and insists that diagnosis must be made before achlorhydria sets in, the gastroscope being useful in the early stages of both ulcer cancer and primary cancer of the stomach. In a proportion of the cases in which the growth was resectable diagnosis was possible only by the gastroscope owing to smallness of the neoplasm. In duodenal ulcer the author is convinced that surgical treatment should depend upon the degree of mucous hyperplasia observed on endoscopic examination.

Massage.

H. F. WOLF (*Journal of the Mount Sinai Hospital*, January-February, 1941) contributes a paper on the physiological basis of the early treatment of injuries. He makes a plea for the early use of massage in the treatment of fracture. He considers that massage is used much too little, owing to lack of appreciation of its action in emptying engorged veins, removing internal débris, such as extravasated blood and destroyed cells, and relieving muscular spasm. It is necessary to distinguish between massage and rubbing. Only gentle *effleurage* should be used, which must be painless and very gently applied. The author deprecates the use of heat for more than a few days, because in his opinion massage is a more effective way of removing damaged tissue.

Pulmonary Fat Embolism.

A. H. T. ROBB-SMITH (*The Lancet*, February 1, 1941) reports cases in which he has investigated the possibility that pulmonary fat embolism may be a factor in the fatal outcome of accidental injuries. Conditions which may induce pulmonary fat embolism range from a severe bodily shaking without bony injuries to multiple and compound fractures. It is also to be found in severe burns and poisoning, especially with alkalis. A characteristic feature of the clinical picture is the "symptom-free interval", a period varying from a few hours to two days. Fat droplets may be detected in the *fundus oculi* and in urine. Details of the analysis of 29 cases are set out in tables. Early immobilization of the affected parts is the most important prophylactic measure. In treatment oxygen should be given to relieve anoxæmia; morphine should be avoided. Transfusions either of whole blood or plasma should be withheld when symptoms of fat embolism have developed. The pulmonary symptoms which arise from the blast of high explosives may be due to a combination of pulmonary concussion and fat embolism, and fat emboli should be looked for in autopsies on air-raid casualties.

Diaphragmatic Hernia.

R. LEWISOHN (*Journal of the Mount Sinai Hospital*, January-February, 1941) reports a case of strangulation of the transverse colon in a diaphragmatic hernia. The patient was a male, aged twenty-three years, and had suffered from multiple stab wounds of the chest some ten months previously. On admission to hospital he presented unmistakable signs of intestinal obstruction, but the cause was not apparent. The findings on X-ray examination, including a barium enema, suggested a neoplasm, but compression by an outside mass could not be excluded. The site of the lesion was diagnosed as the splenic flexure, which was reported as being displaced to the flank and upward. As the symptoms did not subside, a caecostomy was performed. Subsequently a laparotomy revealed that the splenic flexure was caught in a diaphragmatic hernia. One and a half years later this patient was still in perfect health. The author points out that a correct diagnosis might have been made prior to the former of the two operations had the significance of the trauma to the patient's thorax been recognized.

Surgery in Ulcerative Colitis.

JOHN H. GARLOCK (*Annals of Surgery*, January, 1941) states that 10% to 20% of patients with ulcerative colitis do not respond sufficiently to medical treatment to enable them to carry on their activities in comfort. The disease is a progressive, but remittent, inflammatory condition of the colon with ulceration of the mucosa and fibrosis and scarring of all the coats, until finally the colon becomes a thick, fibrotic, shortened tube lined by granulation tissue exuding pus and blood. Loss of weight, anæmia and toxæmia are prominent. In the author's opinion, surgical treatment must provide complete diversion of the fæcal stream from the diseased bowel, and, therefore, appendicostomy, caecostomy and loop colostomy are condemned. For this reason, in the majority of cases ileostomy is carried out. In a few cases, when the disease is segmental in distribution, colostomy may be used. For instance, if the disease process is confined to the sigmoid colon, a transverse, completely disconnecting colostomy may be the most suitable method. Ileostomy has been performed for severe bleeding and has successfully minimized further hæmorrhage. When the condition is acute and profound toxæmia is present, the author considers it a life-saving measure. He also recommends it for cases of "threatened perforation". The technique used involves a small right subumbilical paramedian incision through which the upper end of the divided ileum is brought, while the lower end is drawn out through a small incision in the right iliac fossa. Stress is laid on the necessity for the avoidance of any exploration of the colon at this stage, as this may lead to perforation of the friable bowel. The general condition of the patient improves, and when this improvement has reached its maximum, resection of the diseased colon, perhaps in stages, is performed. The ulcerative process sometimes ends abruptly at the recto-sigmoid junction, and in this case it may be possible to anastomose the ileum to the rectum and thus to restore natural control.

Gastro-Jejuno-Colic Fistula.

A FISTULOUS communication between the stomach, jejunum and colon is the most serious of all the complications of gastro-enterostomy. D. B. Pfeiffer (*Surgery, Gynecology and Obstetrics*, February 15, 1941) states that when this complication occurs the pain of the gastro-jejunal ulcer often disappears. But the fæcal vomiting and belching of foul wind, the anorexia, and the severe diarrhœa which is usual, rapidly reduce the patient's condition to one of extreme seriousness. Medical measures are useless for cure, but are essential as a preliminary to surgery, in order to restore the patient to a reasonable condition to withstand operation. Direct attack on the fistula is fraught with danger owing to the patient's poor condition and the fact that the tissues surrounding the fistula are usually œdematous and infected. The most serious consequences of the lesion are the result of the passage of colonic contents into the jejunum and stomach, rather than of the passage of food in the reverse direction. This is shown by the fact that if preliminary loop colostomy of the ascending or right transverse colon is performed, in most cases the symptoms immediately subside and diarrhœa ceases. The author therefore recommends that this should be done as a routine measure. Rehabilitation of the patient by transfusions (especially of plasma), high caloric diet and rest in bed is much easier. At the attack on the main lesion the surgeon is then operating on a clean colon and thus the grave danger of peritonitis is greatly reduced. The second stage should not be hurried, and weeks or months may be occupied in obtaining the maximum improvement by medical measures. The most suitable operation at the second stage is subtotal gastrectomy with the necessary repairs and anastomoses.

Cavernous Sinus Thrombophlebitis.

THE condition of bacteriæmic staphylococcal cavernous sinus thrombosis is so uniformly fatal that Champ Lyons (*Annals of Surgery*, January, 1941) considers it proper to record the recovery of two consecutive patients following the use of heparin and chemotherapy. The condition in each case followed the occurrence of a nasal furuncle. Staphylococci were recovered from the blood by culture. Various cranial nerve palsies were present. In one patient a staphylococcal meningitis developed and a culture was obtained from the cerebro-spinal fluid. Both patients had pulmonary infarcts during the course of the disease. The heparin was administered with the object of preventing the extension of septic thrombi in and around the primary focus of infection and in the affected cavernous sinus. The chemotherapy controlled the bacteriæmia and the meningitis. Sulphathiazole was found more effective than sulphapyridine in these two cases. Full dosage, enough to maintain a blood concentration of five milligrammes per 100 cubic centimetres, was necessary for prolonged periods to control the meningitis.

Indelible Pencil Injuries.

M. L. MASON AND H. S. ALLEN (*Annals of Surgery*, January, 1941) discuss injuries to the hands and fingers by the points of indelible pencil. These are not common injuries, but lesions may occur with serious consequences. The injurious substance is the dye which gives the indelible property to the lead. The dye most frequently used is methyl violet. These dyes cause chemical necrosis. There is a disturbance of cell metabolism due to affinity of the dye for nucleic acid in the cell nucleus. The dye dissolves in the tissue fluids and all adjacent tissue undergoes necrosis. Thrombosis in nearby vessels may occur and aggravate the process so that whole phalanges or digits may become necrotic. Occasionally, general symptoms of intoxication—headache, malaise, gastro-intestinal disturbances—occur. Kidney damage may be produced, as the dye is

slowly excreted by these organs. The occasional occurrence of jaundice indicates that the liver too may have some excretory function. The puncture wound of entry continues for a long time to discharge a purple fluid. If an incision is then made, a purple ulcer forms, which persists for weeks or months. The treatment is immediate and complete excision of the track including the lead and, where possible, all tissues stained by the dye. When essential structures are stained, this may not be possible, and then the wound should be left widely open. An important point is that the piece of lead should not be picked out with forceps, as it is apt to break up and pieces of dye are then scattered throughout the wound. In severe cases amputations have been necessary.

Indications for Splenectomy in the Presence of Anæmia and Splenomegaly.

A. O. WILENSKY (*Surgery*, January, 1941) discusses the indications for splenectomy in splenomegaly associated with anæmia. He describes illustrative cases and concludes that, in the present state of clinical knowledge, the indication for splenectomy in the clinical association of splenomegaly and hypochromic anæmia exists under only two conditions: first, when spherocytes are demonstrable in the circulating blood of a person who is the subject of hæmolytic icterus, and secondly, in chronic purpuric conditions, when the number of platelets is very low. Under such conditions a good result can be expected, the operation being best done during a remission period.

Traumatic Surgery.

THE March, 1941, number of *The American Journal of Surgery* is devoted to a symposium on traumatic surgery. E. L. Gilcreest, in a presidential address, reviews the progress of traumatic surgery and emphasizes the increasing seriousness of accidents in modern life. In the United States accidents rank fourth (after heart disease, cancer and pneumonia) in frequency as a cause of death. Gilcreest stresses the necessity for an understanding of the principles of wound healing and the importance of careful *débridement*. He deplores the fact that the Carrel-Dakin method of wound irrigation is being used less, but praises the use of sulphanilamide by local implantation. Extra instruction of medical students in traumatic surgery is advocated and it is pointed out that recent graduates will have to treat many more patients suffering from trauma than from goitre, brain tumour *et cetera*.

P. H. Kreuscher joins the previous contributor in regretting the waning use of the Carrel-Dakin method. In a review of the treatment of fresh wounds, he lays most emphasis on *débridement*. He advocates the paying of special attention to the subsequent restoration of function.

D. M. Glover and A. F. Sydow, as a result of fifteen years' experience, endorse the tannic acid treatment of burns. They favour complete removal of the coagulum once separation begins, and achieve this by continuous applications of fresh Dakin's solution. The dyes are regarded as satisfactory coagulants, but as slower than tannic acid. These workers do not favour any of the other methods of treatment, such as applications of cod liver oil or continuous warm baths.

A. Kolodny discusses traction paralysis of the brachial plexus with special reference to its occurrence in adults. He presents the results of some original work on the changing obliquity of the neural groove of the cervical vertebræ with age. Four cases of traction paralysis are presented, and Kolodny reviews the indications for and results of exploration of the injured plexus.

The symposium on traumatic surgery includes other contributions on post-traumatic osteoporosis, tendon repair, protrusion of intervertebral disks, and face and jaw injuries.

Operation in Jaundice of Recent Onset.

A. L. BLOOMFIELD (*Surgery*, January, 1941) puts the question: "How long should operation be deferred in cases of intense jaundice of recent onset?" He points out that the conditions usually responsible for recent intense jaundice are hepatitis, stone and cancer. When the underlying condition is obscure, there is difficulty in deciding how long to wait before the performance of laparotomy, since operation is unnecessary and possibly harmful in hepatitis, while in the other two conditions delay may be dangerous. The author analyses the progress in 29 cases of subsequently proved hepatitis and finds that improvement is demonstrable in the great majority after one month. He concludes, therefore, that it is not justifiable to wait longer before proposing operation to patients when the jaundice is stationary or becoming worse.

The Use of Silk in Infected Wounds.

E. C. CUTLER AND J. E. DUNPHY (*The New England Journal of Medicine*, January 16, 1941) present a paper on the use of silk in infected wounds. Laboratory animals were employed in the original experiments and pairs of parallel abdominal wounds were made in each animal. These wounds were infected by equal amounts of a bacterial culture and one of each pair was repaired with catgut and the other with silk. Only 50% of the silk wounds suppurated, while 100% of the catgut wounds opened and discharged a purulent exudate. Further, in the latter wounds, the infection was earlier and more severe. The authors then employed silk suture in over 200 operations in potentially or grossly infected surgical conditions. They record the results in these cases and conclude that the use of fine silk sutures gives better results than the use of catgut. They stress, however, that the accepted rules of silk technique must be strictly observed. These include the use of fine silk, the cutting of ends short, and the avoidance of continuous sutures. They believe that sutures should be spaced rather more widely than in clean wounds. The silk employed was fine black silk, with a breaking tension of four pounds.

Carcinoma of the Extrahepatic Bile Ducts.

H. L. STEWART, M. M. LIEBER AND D. R. MORGAN (*Archives of Surgery*, September, 1940) present a clinical and pathological study of carcinoma of the extrahepatic bile ducts. The principal symptoms in the cases described by him were jaundice, anorexia, fever, vomiting, diarrhœa, constipation and nausea. Other less common symptoms were abdominal distension, chills, a sense of weight or pressure in the abdomen, flatulency and belching. Correct provisional pre-operative diagnosis was made in 20% of cases. A correct surgical diagnosis was made in 36% of cases in which operation was performed. X-ray examination was of no direct value in clinical diagnosis. Extensions or metastases occurred in 45% of cases. Early diagnosis is essential and laparotomy performed early, when the patient's general condition is not yet critical, gives better results. A proved case of primary carcinoma of the cystic duct has not been found reported in the literature.

Pulmonary Embolism.

P. R. WESTDAHL (*The Western Journal of Surgery, Obstetrics and Gynecology*, February, 1941) reviews briefly the literature on pulmonary embolism, presents a statistical study of 247 medical and surgical cases at the San Francisco Hospital, and emphasizes certain points of significance. Embolism implies thrombus formation, and this is due to three main factors: slowing of the blood flow, increased coagulability of the blood and irregularity in the vessel wall. Blood flow may be slowed from local causes and, in the series presented by the author, thrombi were found in frequent association with the recognized anatomical sites of pressure on the large veins (such as under Poupart's ligament and at the point where the right common iliac artery crosses the left common iliac vein) and also where constriction of veins had been caused by tumours. The general immobility of the patient contributes to blood stagnation, and is often due to the tendency of surgical patients to lie still for fear of pain or of disrupting the wound. Increased coagulability of the blood is an important factor, and a rise in fibrinogen and in the number of platelets is usual after operations and parturition. The author considers that changes in the vessel wall, while a factor in many thromboses, are probably not a marked feature in the formation of those large thrombi which lead to fatal embolism. It is just those patients with little or no phlebitis in whom large emboli are readily detachable. Infection has been regarded as a possible cause of post-operative thrombosis, and Rosenow claimed to have isolated a streptococcus from the embolism in each of five cases of post-operative embolism. Other workers, however, have been unable to demonstrate bacteria in larger series of cases. The diagnosis of pulmonary embolism may be difficult, as there are no pathognomonic signs. Coronary occlusion offers the greatest problem in differential diagnosis; in non-fatal cases or those slowly becoming fatal an electrocardiogram may help. In cardiac patients the two conditions may exist concurrently. The author discusses the treatment of post-operative pulmonary embolism and stresses the view that, under present conditions, prophylaxis is of more value than attempts at cure of the established condition. Therefore, in the absence of any contra-indication and with due regard to the patient's strength, early institution of active and passive movements, especially of the lower limbs, is wise. The position of the patient, especially that of elderly, obese subjects, should be changed frequently. Intravenous administration of heparin has been suggested in order to correct the increased

coagulability of the blood; but the author appears to have had no personal experience with this agent. When embolism has occurred, shock should be treated, and there are two possible lines of local treatment. Operative removal of the embolism is so hazardous a procedure that it has not been generally accepted as feasible. Reflex spasm of the pulmonary arteries has been posulated by some observers, it being held that in many fatal cases the plugging effect of the embolus alone would be insufficient to cause death. Such spasm can be treated by the intravenous administration of papaverine. The author had only one opportunity of using this drug, but the patient succumbed. He considers, however, in view of encouraging reports from other workers, that papaverine should be available in all surgical wards for emergency use. He concludes by again insisting that preventive measures have the greatest value.

Colostomy and Ileostomy.

M. E. STEINBERG (*The Western Journal of Surgery, Obstetrics and Gynecology*, November, 1940) describes a new method of colostomy and ileostomy; he uses a double length of bowel between the muscular layer of the parietes and the skin as a pouch for the retention of fæces until it is convenient to evacuate them. A midline or paramedian incision is made to gain access to the bowel and deal with the pathological condition. A transverse incision, about six centimetres long, is made at the level of the left anterior superior spine of the ileum between the spine and the mid-line. This incision penetrates all the layers of the abdominal wall, including the peritoneum. Another transverse incision, which is a little longer than the lower one, is made about eight to ten centimetres above the last one and parallel to it. The upper transverse incision penetrates the skin only. The skin between the upper and lower incision is undermined. The sigmoid loop intended for the colostomy is divided, a distal loop being fashioned, measuring ten to twelve centimetres, and closed at both ends. Both loops of the proximal part of the sigmoid are pulled through the lower transverse incision and through the tunnel made under the skin. The distal loop of the sigmoid, which is closed at both ends, is turned 180°. The bowel protruding at the lower transverse incision can be opened later. On the sixth or seventh day crushing clamps are applied to both loops at the upper transverse incision. In this manner a pouch is formed under the skin which empties through the colostomy opening at the lower incision.

Fuchs's Test for Malignant Disease.

C. S. ROBINSON, R. EVERS AND A. TRUEX (*Archives of Surgery*, September, 1940) have investigated Fuchs's test for malignant disease. Fuchs observed that washed fibrin from one species of animal was not digested by the serum from other species. Blood from patients suffering from various diseases and malignant tumours reacted towards blood from healthy subjects as though it were blood from another animal; thus the fibrin from the blood of a cancer patient was digested by serum from a non-cancerous person, but not by that from another person suffering from cancer. The authors set out the results obtained and analyse those cases in which the test disagreed with the findings. They conclude that the test has certain limitations: (i) the growth must be six months old; (ii) the patient should not have been operated on or have received radium or X-ray treatment for at least a month; and (iii) the tumour must be in a period of active growth.

Surgical Treatment of Essential Hypertension.

W. CRANE (*The Western Journal of Surgery, Obstetrics and Gynecology*, February, 1941) discusses the surgical treatment of essential hypertension. He emphasizes its frequency and importance and enters a plea for a more sympathetic interest in the attempts that are being made to treat the condition on surgical lines. The surgical attack is directed against the nervous system and is aimed at securing denervation of the splanchnic vessels, the kidneys and the adrenal glands and of a large part of the lower extremities. Three procedures have been employed. They are bilateral resection of the splanchnic nerves above the diaphragm, splanchnic resection below the diaphragm, and cœliectomy. The author considers that the careful selection of patients is the most important part of the procedure, and he accepts for surgery only about 10% of prospective patients. He outlines the methods of selection and discusses the results of treatment in 16 personal cases. This series of patients was operated upon without mortality, and the author claims relief of symptoms in 63% and satisfactorily maintained reduction of blood pressure in 37%.

MEDICINE.

Aluminium Hydroxide and Peptic Ulcer.

S. ALLEN WILKINSON AND PETER D. COMANDURAS (*The New England Journal of Medicine*, December 12, 1940) report the results of a two-year study of the treatment of peptic ulcer with aluminium hydroxide, and of the comparative neutralizing effectiveness of Sippy powders and aluminium hydroxide in reducing gastric acidity. The authors state that the treatment of peptic ulcer without complications is primarily medical, and that this principle is accepted today by the majority of workers in this field; such treatment in addition to diet, rest and other usual hygienic measures includes the reduction and, if possible, the complete neutralization of gastric hydrochloric acid by means of various alkali substances. The unequivocal relationship that acid bears to the problem of peptic ulcer rests on the foundations of experimental and clinical medicine. The authors refer to the experimental evidence of Mann and Williamson, Dragstedt and others, which has shown that the production of duodenal ulcer in dogs, the prevention of healing of these ulcers and their probable recurrence after healing are phenomena intimately associated with the unneutralized presence and unhampered activity of free acid in the stomach. They quote Lahey's opinion that "there seems little question that the best surgical results immediate and remote, are in those ulcer patients who postoperatively have a very low gastric acid or gastric anacidity", and also the statement of Ivy that "although it cannot be proved that gastric juice is the factor irritating peptic ulcer, much evidence indicates that unneutralized gastric juice is an important if not a prime factor contributing to the chronicity of peptic ulcer". The authors have made an attempt to evaluate the efficiency of Sippy powders and aluminium hydroxide as neutralizing agents of the hydrochloric acid of the stomach in peptic ulcer cases over a period of two years' observation. In a series of 308 cases, 521 gastric analyses were performed; of these, 50% were made following the use of Sippy powders exclusively, 30% following the use of aluminium hydroxide exclusively, and 20% following the use of mixtures and proprietary remedies. Determinations of gastric acidity were made with an unvarying procedure, involving the withdrawal of alkalis for twelve hours prior to the administration of a standard Ewald test meal on a fasting stomach, and the figure used was obtained from a specimen aspirated forty-five minutes after the meal, the figure representing free hydrochloric acid expressed as the number of cubic centimetres of N/10 sodium hydroxide required to neutralize 100 cubic centimetres of gastric juice. Acid determinations were made at periods of three, six, nine, twelve and twenty-four months in each case in order to ascertain what changes, if any, occurred at these times as compared with the gastric analysis made on the first admission of the patient to hospital, and an increase of acidity was taken to mean one of 20 units or over, a decrease to mean one of 20 units or over, and little or no change to mean an alteration of not more than 19 units in either direction. Following the use of aluminium hydroxide, 40% of the acid determinations at the end of three, six, nine and twelve months revealed a reduction in gastric acidity of 20 units or over; following the use of Sippy powders approximately 20% of the determinations revealed such a decrease. There were more than three times as many reductions of 40 and 50 units and over following the use of aluminium hydroxide than there were following the use of Sippy powders. It was found that in the cases with severe complications and in those with a duration of twenty years and over, aluminium hydroxide showed greater efficiency in reducing acidity than did Sippy powders. The authors admit the efficacy of Sippy powders in promptly neutralizing the stomach acidity when given in adequate doses, but state that this form of therapy when applied so as to neutralize the free hydrochloric acid completely, is often attended by symptoms of toxæmia and alkalosis. They also observed that patients with ulcer and renal insufficiency, hepatic cirrhosis, arteriosclerosis or hypertension are very susceptible to alkalosis, and also that the sodium bicarbonate in Sippy powders has a tendency to produce a reactionary hyperchlorhydria. They reiterate the claim that aluminium hydroxide combines with the gastric hydrochloric acid to form aluminium chloride, and in the small intestine the biliary and pancreatic secretions react with it to reform sodium chloride and reprecipitate aluminium hydroxide; thus colloidal aluminium hydroxide can act as an efficient neutralizer of gastric acidity, is non-absorbable and therefore incapable of producing alkalosis. The authors conclude from their study that aluminium hydroxide is a much more effective neutralizer of gastric acidity over a long-term period than are Sippy powders.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on April 17, 1941, at the Royal Alexandra Hospital for Children, Sydney. The meeting took the form of a number of clinical demonstrations by members of the honorary medical staff of the hospital. Parts of this report appeared in the issues of May 17 and 24, 1941.

Chronic Bronchitis.

DR. R. A. R. GREEN showed a boy, aged twelve years, who had been admitted to the hospital on January 5, 1939. He had suffered from influenza four months previously, but this was not complicated by bronchitis. He had had a persistent cough since then, with a small amount of sputum.

Examination of the patient's chest revealed an impairment of the percussion note in the right subapical region anteriorly and the right interscapular area posteriorly. The breath sounds were broncho-vesicular to bronchial in type; rhonchi were present in the same areas.

On January 17 an X-ray examination was made. The frontal sinuses appeared clear; the right ethmoid sinus appeared clear and the left dull; mucosal thickening was present in the antra. In the lungs slight but obvious chronic bronchitic changes were present; no appearances suggestive of tuberculosis were seen. At this time the lung signs were less pronounced; alterations were still present in the breath sounds in the right axilla and interscapular area.

On February 13 the antra were explored, but a cough was still present. Rhonchi were present at the right axilla and râles at the base of the left lung. In March, 1939, the patient was sent to "Juong", at Springwood, in the Blue Mountains; he returned three weeks later with slight bronchitic signs at the bases of both lungs. He was given an iron mixture. On December 7 it was recorded that the patient had been to "Juong" again, and that he had a slight cough.

An X-ray examination on January 4, 1940, revealed very little alteration; it was thought that the abnormal appearances were slightly less pronounced. The patient was well, and clinical examination revealed no abnormality in his chest. Breathing exercises were prescribed. On February 1 the patient's condition had improved; no abnormality was detected in the chest, and the expansion was good. On July 25 examination revealed that the breath sounds were harsh at the base of both lungs. On September 26 and on October 31 the patient was very well and no abnormality was detected in the chest. On January 9, 1941, the patient was found to have gained six pounds in weight during the last three months. No abnormality was detected in the chest. It was reported that four members of his family had died of tuberculosis since 1936. Radiological examination revealed chronic bronchitic changes, but no evidence of tuberculosis. On April 3 the patient had gained more in weight and his cough had diminished. His chest appeared normal.

Dr. Green said that the case was a good example of the use of deep-breathing exercises in the treatment of chronic bronchitis. In almost all such cases it was noted that the lower portion of the chest moved poorly, and the effect of breathing exercises was very greatly to improve that condition. Correct breathing, with attention to any infection of the upper portion of the respiratory tract, and a change to a drier climate, offered good hope of overcoming chronic bronchitis. The condition of the boy under discussion at the time of the meeting, and the fact that he had had no recurrence of his illness during the previous winter, made it unlikely that he would break down.

Bronchiectasis.

Dr. Green finally showed a female patient, aged six years, who had been admitted to hospital on October 16, 1940, having had a cough all her life. She was an unhealthy looking child, and her colour was dusky. The heart sounds were normal; the apex beat was half an inch outside the nipple line. There was tubular breathing below the left scapular angle, and fine râles were scattered over both lungs. The child had a persistent cough and produced thin watery sputum.

On October 30 the patient became cyanosed and oxygen was administered. On November 4 she had an hæmoptysis. On November 11 the sputum became thicker and mucopurulent; no tubercle bacilli were found on examination. An X-ray examination on October 26 revealed pronounced chronic bronchitis and bronchiectasis at the bases of both lungs. A further X-ray examination on November 28 revealed mild induration of the medial aspects of both lung bases; the appearances suggested advanced bronchiectasis.

The child was given "M & B 693", at first two tablets and later one tablet every four hours for four days; she was also given a benzoate and camphor mixture with creosote. Later she was sent to "Shuna", at Leura, in the Blue Mountains, where she remained for eight weeks. She had breathing and postural exercises. On April 3, 1941, her colour was good, but she still coughed at night. The breath sounds were harsh at the bases of both lungs. An X-ray examination revealed a pronounced improvement in the condition of the lung bases.

Dr. Green remarked that the patient's condition might have been of congenital origin or might have followed an acute bilateral lung infection in infancy. The history was not sufficiently clear to allow this question to be decided. The patient had progressed well, and her improvement illustrated the value of breathing exercises and a change to a drier climate. The lower portion of the chest moved poorly at first; but at the time of the meeting expansion was good. The child's good general condition and the improvement revealed radiographically offered good hope that she would continue to make progress.

Cœliac Disease.

DR. D. G. R. VICKERY showed a female patient, aged four years, who had been admitted to hospital on July 4, 1940. The mother had noticed that the child's abdomen had been enlarged for two years. The patient ate well, and the stools were not abnormally large.

On examination the patient was seen to be an undernourished child, with a dusky complexion, small buttocks, pronounced wasting of the legs and a very large abdomen. The Mantoux test produced no reaction; microscopic examination of the urine revealed no abnormality; the curve obtained by the performance of the glucose tolerance test was of the flat type. The stools were bulky, offensive and pasty. The total fat content of the dried fæces was 48%; 21% of the total fat was unsplit and 79% was split fat. An X-ray examination revealed no abnormality in the chest; the long bones were found to be unusually transradiant, and this condition was thought to suggest a nutritional dystrophy.

The child was given a diet with a low fat and a high protein content; "Radiostoleum" was given three times a day in doses of six minims. Two cubic centimetres of liver extract were given intramuscularly every second day, and iron and dilute hydrochloric acid were administered. Her condition gradually improved.

Dr. Vickery said that the child presented the typical picture of cœliac disease; interest lay in the late age, almost four years, at which the child was brought for treatment. Because the disease had been present but untreated for two years, much stunting of growth had occurred. The child's height was 31 inches, while the normal for her age was 39 inches; her weight was 19 pounds, normal being 36 pounds. While she was in hospital she gained little weight; but since her discharge she had been given a diet of high protein content, skimmed lactic acid milk, vitamin *B* and "Calciferol". The stools were more normal and the child had gained five pounds in weight—25% of her former weight—in four months. The outlook for ultimate complete recovery was good; but there was a real risk of the development of cœliac rickets during the next expected period of rapid bony growth, at the age of six or seven years. Even though vitamin *D* absorption had been poor, there was no evidence of rickets, because growth had been so slow.

Congenital Heart Disease and Rheumatic Carditis.

Dr. Vickery then showed a female patient, aged five years, who had been admitted to hospital on June 29, 1940, with the history that she had had several attacks of extreme listlessness and pyrexia over the previous four months. During this period she also had pyelitis whilst being treated in hospital.

Examination revealed a well-nourished child in no obvious distress. The tonsils were large. The apex beat was situated in the sixth intercostal space, three-quarters of an inch outside the nipple line; there was a palpable presystolic thrill. A roaring cogwheel murmur was audible at all areas, especially just to the left of the sternum, and there was a systolic and diastolic murmur at the apex. The blood sedimentation rate was 25 millimetres after one hour and 41 millimetres after two hours.

Treatment consisted in the administration of salicylates and in rest in bed for two months; at the end of that time the sedimentation rate was normal and the cardiac murmurs

were unchanged. An X-ray examination revealed that the cardiac shadow was somewhat larger than normal, especially the left ventricle; the appearance was not typical of a mitral lesion. The curve of the pulmonary artery was slightly exaggerated, and it was likely that the child was suffering from congenital heart disease. Chronic bronchitis was present, with probable early bronchiectasis.

Dr. Vickery said that the condition was a typical example of congenital patency of the *ductus arteriosus*; but it was complicated by an attack of acute rheumatism with residual carditis. Involvement of the mitral valve was indicated by the systolic and diastolic murmurs at that area, and there was a considerable likelihood that permanent mitral stenosis would develop.

Polyneuritis.

Dr. Vickery finally showed a male patient, aged three years and ten months, who had been suffering from pertussis for five weeks when he was admitted to hospital on January 18, 1941. He had had numerous attacks of epistaxis and hæmoptysis during the first few weeks of the pertussis. Two weeks prior to his admission to hospital he complained that both his arms and legs were tender and he was unable to hold anything in his hands.

Examination revealed bilateral wrist-drop and some slight weakness of the flexors and extensors of both feet. Some paralysis of the diaphragm was also present, though there was no gross impairment of respiration. There was no involvement of the intercostal muscles, back muscles or abdominal muscles. The right side of the chest appeared to move slightly less than the left; no further abnormality was detected.

The Schick test produced no reaction. An X-ray examination of the lung fields revealed a difference in transradiancy between the right and the left. A blood count gave the following information: the erythrocytes numbered 4,000,000 to 5,000,000 per cubic millimetre, and there was no evidence of stippling; the hæmoglobin value was 90%. The leucocytes numbered 6,300 per cubic millimetre; 48% were polymorphonuclear cells, 40% were lymphocytes, 9% were monocytes and 3% were eosinophile cells. The cerebro-spinal fluid was normal. Examination of a swab taken from the throat for the presence of hæmolytic streptococci gave negative results.

On January 21 the wrist-drop was still present; the condition of the diaphragm was unchanged, but that of the legs was normal. A gradual improvement in the condition of the right hand and a slight improvement in that of the left followed. The breathing gradually improved until March 10, when the child had a slight cold and the paralysis of the diaphragm recurred just as severely as before. At the time of the meeting this had gradually improved, though it was still present to a slight extent. Treatment consisted in the application of splints and in massage. Two cubic centimetres of "Vibex" were given by intramuscular injection twice a day at first; later half a drachm of liquid "Vibex" was given three times a day with meals, and this treatment was still being continued at the time of the meeting.

Dr. Vickery said that he believed that the condition from which the child suffered was polyneuritis following pertussis. There was evidence of encephalitis; mental apathy and a mask-like face had been present, but these had disappeared. Encephalitis was a much more usual sequel to pertussis. The child's lesion was certainly of the lower motor neurone type, and the steady improvement and the presence of anæsthesia at the onset suggested peripheral neuritis. Lead poisoning was excluded by the absence of stippling of the erythrocytes and of an excess of lead in the urine. Poliomyelitis and polyneuritis of the Guillain-Barré type were excluded by the normal cerebro-spinal fluid, although it had to be admitted that lumbar puncture was not carried out until two weeks after the onset of the illness. Post-diphtheritic paralysis was excluded by the unusual distribution of the weakness and by the fact that, although steady improvement was taking place, it was slow.

Congenital Stenosis of the Lower End of the Œsophagus.

DR. P. L. HIPSLEY showed a male baby, who had been admitted to hospital at the age of seven months; he weighed seven pounds eleven ounces at birth. The baby had always been inclined to vomit after food; the food was returned without effort and was generally mixed with mucus; at times mucus alone was returned. The child steadily gained in weight, in spite of the vomiting, and at the age of twenty-eight weeks he weighed fifteen pounds seven ounces. At that stage the vomiting became worse and the child wasted rapidly; the continuous administration of saline solution by the intravenous drip method became necessary. Several unsuccessful attempts were made to pass a soft rubber catheter into the stomach, and an unsuccessful attempt was made to pass a mercury-filled bougie. An X-ray examination after an opaque meal revealed slight dilatation of the œsophagus, with delay in the passage of the medium at the lower end.

Gastrostomy was performed and the child's condition improved. There had been periods when all food could be taken by mouth, alternating with periods when swallowing was impossible and feeding by the gastrostomy opening had to be resorted to. After twelve months in hospital the child began to swallow food normally, and the gastrostomy opening was allowed to close. A few weeks before the meeting a gastroscopic examination was made by Dr. Milton Coutts; he was able to pass the gastroscope through the apparently constricted portion of the œsophagus into the stomach. The appearance of the lining membrane of the portion of the œsophagus just distal to the stenosed segment resembled gastric mucosa.

Dr. Hipsley remarked that Findlay and Kelly had reported a number of similar cases. They had demonstrated to their satisfaction that the lining membrane distal to the stenosed portion of the œsophagus was actually gastric mucosa. They held that these patients had a congenitally shortened œsophagus and a partial thoracic stomach.

Sexual Precocity.

DR. S. G. BRADFIELD showed a female patient, aged six years, who had been admitted to hospital in May, 1940; she had always been big for her age and over-developed. Abnormal breast development had been present since infancy. She was an average pupil at school; her intelligence and her general health were good. The only previous illnesses were chickenpox and measles. There was one other child in the family, who was healthy.

On examination the child was found to be menstruating. She was very tall for her age. The breasts were enlarged and some pubic hair was present. The *labia minora* and *labia majora* were enlarged and the clitoris was small. The abdomen was soft and no masses were palpable. No abnormality was detected in the nervous system. The weight was four stone seven and a half pounds. The height was four feet four and a half inches; the measurements from symphysis to sole and from symphysis to vertex were, respectively, 24·5 inches and 27·75 inches. The bust measurement was 26·25 inches and the hip measurement 26 inches. A blood count revealed no abnormality. X-ray examinations were made of the renal tract and of the skull, but no abnormal appearances were detected. An X-ray examination of the bones revealed an advance in osseous age. No abnormality was detected in the optic fundi and the fields of vision were normal. The Wassermann test produced no reaction. The curve obtained by the performance of the glucose tolerance test was somewhat low and flat. It was considered that the child might have an ovarian tumour, and laparotomy was performed by Dr. Shedden Davis; but no tumour was found. No abnormality was revealed by a ventriculographic examination carried out by Dr. Shedden Davis.

Dr. Bradfield said that tumours of the ovary and adrenal gland had been excluded from the diagnosis. The other recognized cause of sexual precocity in females was a lesion, either neoplastic or inflammatory, of the hypothalamus or floor of the third ventricle. The patient under discussion showed no positive neurological signs of a lesion in that area; but in other reported cases neurological signs of an intracranial lesion had been very slight. The child was to be kept under observation.

Anæmia.

Dr. Bradfield next showed a male baby, aged sixteen months, who was just beginning to crawl. The child was backward in development. He had had condensed milk from birth, and at the age of five months orange juice, emulsion and strained rolled oats were added to his diet. At the time of the meeting soup had been added. No eggs were given.

Examination revealed that the child was pale and the fontanelles were not closed. Harrison's sulcus was not present. A blood count gave the following information: the erythrocytes numbered 4,600,000 per cubic millimetre and the hæmoglobin value was 52%; the leucocytes numbered 9,300 per cubic millimetre, 37% being neutrophile cells, 55% lymphocytes and 7% monocytes.

Treatment consisted in the administration of "Adexolin" and *Mistura Ferri Sulphatis*. The child was provisionally considered to be suffering from nutritional anæmia, due to the condensed milk diet.

Dr. Bradfield said that milk contained very little iron, and the infant maintained erythropoiesis only by virtue of the iron he had stored during fœtal life. This became

exhausted after some months, and every child needed some iron-containing food by the time he reached the age of nine to twelve months.

Dr. Bradfield's next patient was a female, aged nineteen months. She had been breast fed until the age of six months and was then given "Farex" and cow's milk. She had had no sweats, but she had a persistent cough. The child appeared well; she was stout. Harrison's sulcus was present. The anterior fontanelle was still open. X-ray examination revealed a mild rhachitic deformity of both tibiæ.

On November 2, 1939, the tonsils and adenoids were removed. On May 9, 1940, a blood count gave the following information: the erythrocytes numbered 3,900,000 per cubic millimetre and the hæmoglobin value was 57%; the leucocytes numbered 7,600 per cubic millimetre, 40% being neutrophile cells, 47% lymphocytes and 12% monocytes. A further blood count on November 28 gave the following information: the erythrocytes numbered 3,900,000 per cubic millimetre, and the hæmoglobin value was 67%; the leucocytes numbered 11,000 per cubic millimetre, 67% being neutrophile cells, 30% lymphocytes and 3% monocytes. On March 31, 1941, the child was well.

Treatment consisted in the administration of "Radiostoleum", 15 minims three times a day from June 5, 1939, until November 11, 1940; from then onwards five minims were given three times a day. *Mistura Ferri Sulphatis* was given from May 5, 1940, until the time of the meeting, and *Mistura Ipecacuanhæ* was given from August 24, 1939, until September 24, 1939. The diagnosis of rickets and anæmia was made.

Dr. Bradfield said that, as in the previous case, the anæmia was nutritional. The presence of rickets was further evidence of an inadequate or unbalanced diet.

Dr. Bradfield finally showed a male baby, aged nineteen months, who had been admitted to hospital on March 31, 1941. He had had concussion at the age of six months, and for three months he had been irritable, touching his head and crying. He had had no orange juice for one year, and a small amount of apple was given occasionally. Two days prior to his admission to hospital he vomited and his colour became black. The bowels were constipated.

On examination the child was seen to be pale and sweating. The fontanelles were closed and Harrison's sulcus was not present. No abnormality was detected in the central nervous system. He was considered to be suffering from anæmia. A blood count gave the following information: the erythrocytes numbered 4,800,000 per cubic millimetre and the hæmogobin vaue was 60%; the leucocytes numbered 5,800 per cubic millimetre, 14% being neutrophile cells, 73% lymphocytes and 8% monocytes. Hypochromic anæmia and pronounced granulopenia were present, and it was thought possible that the child was suffering from aleuchæmic leuchæmia.

"Redoxon" tablets and *Mistura Ferri Sulphatis* were given from April 7, 1941. It was finally considered that the disorder was a deficiency anæmia, possibly associated with vitamin *C* deficiency. Dr. Bradfield said that anæmia with granulopenia, but with a normal number of lymphocytes, suggested an aleuchæmic phase of lymphatic leuchæmia; it was not uncommon in childhood. Usually, however, the anæmia was much more severe than in the case under discussion. Moreover, in this case there was a nutritional deficiency quite sufficient to account for the degree of anæmia. Progress blood counts and the child's response to iron therapy would decide the issue.

(To be continued.)

A MEETING of the Queensland Branch of the British Medical Association was held at British Medical Association House, Wickham Terrace, Brisbane, on Friday, April 4, 1941, DR. ALAN E. LEE in the chair.

Suicide.

DR. E. H. DERRICK read a paper entitled "Suicide and its Prevention" (see page 668).

DR. J. E. STREETER thanked Dr. Derrick for his paper. He did not think that sex problems were sufficiently represented in the table presented by Dr. Derrick; if all factors were considered, he thought they would be found to be in a much larger percentage.

DR. C. A. THELANDER considered that there was little chance of prevention of suicide in the inoperable carcinoma and advanced organic disease group; life had little to offer to these people. He could not speak of the psychotics—that was the psychiatrist's job. In ancient Roman times suicide was the fashion. Dr. Thelander did not see how religion could help the potential suicide, as it only gave a promise of dividends to come in the future and nothing for the present.

DR. PHYLLIS CILENTO considered that there was not much use in establishing clinics for adult self-help, as the conditions that caused suicide had commenced in the patient's early years; guidance was needed in the years even before school age. Dr. Ruth Griffith had tried to start a child guidance clinic, but had received no help from either the State or clinics. She had had to return to England, where she had since had success with psychological and "evacuee" work. Dr. Cilento thought that if any suggestion were made to the Government it should be with regard to child guidance clinics with trained child psychologists and vocational trainers. The Education Department already had vocational training.

COLONEL B. F. R. STAFFORD said that Dr. Derrick's lecture had enhanced his view of the work Dr. Derrick had already done and could do. Colonel Stafford thought that not enough emphasis was laid on the distinction between suicide by the insane and suicide by the sane. This called for prevention before the certifiable stage. There were in the State organizations for caring for the insane. For the care of potential suicides suggestions were made and enactments had been passed with which some were not conversant, as was evident from the discussion of the meeting. The *Mental Hygiene Act* of 1938 provided for the care of these people and the *Backward Persons' Act* also envisaged the establishment of a psychological clinic with a psychiatrist—in other words, a child guidance clinic, with training and also psychologists. It meant a lot of expense, the cooperation of the public and the profession, and it would lead to a great advance on the road to the prevention of community loss. Colonel Stafford thought that probably all were agreed that the reaction to environment was usually the determining factor of conduct. It was not generally sufficiently realized that the change of environment of a holiday was not the universal panacea and often caused tragedy.

The rapidity of the State's advance with the machinery of guidance clinics would depend on the demand; this was governed by practitioners who recommended patients to such clinics. Colonel Stafford suggested that practitioners should study the *Mental Hygiene Act* and the *Backward Persons' Act*.

MR. MCINNES said that he often felt that the cause of suicides was probably not that shown in the tables. Inquiries could only reveal the final cause, not the train of thought that commenced it, which generally lay a very long way back. A clinic such as suggested by Dr. Derrick could be a very great saving to the community. There were only two hundred suicides recorded in the last five years, but there must have been many cases of partial loss extending over a number of years. Many a person's difficulties could probably have been solved in earlier days. Religion should not offer a post-dated cheque, but cash, and if people could be brought to see this, many lives could be saved. In London Leslie Weatherhead worked closely with the medical profession; he referred cases to them and *vice versa*, and in this way a great deal of good could be done.

DR. KONRAD HIRSCHFELD thanked Dr. Derrick for his interesting address. He had seen 14 suicides; four of the persons were being treated psychologically, two had carcinomata, one had a failing heart with gangrene of the legs, and three suffered from tuberculosis. It was very difficult to do anything with those patients with physical disease; those with psychological conditions were having treatment. The remaining four persons were all members of the medical profession. The first one was a Jew, a new resident in a ward where there were fourteen or fifteen patients on the verge of death. The second was a man from South Africa, with no background and no friends, whose mental make-up could not stand up to conditions. The third was an Indian away from home, and the fourth an anæsthetist in London who did not get the job he had hoped for. These were four lives that should have been saved by kindliness from others; no clinic was needed here and they could only be discovered by someone who knew his work very well. Kindliness was an essential if valuable lives were to be saved.

MR. J. J. LEAHY, coroner for the city of Brisbane, said he appreciated very much Dr. Derrick's kindness in enabling him to be present at this discourse. He had thought the subject rather gloomy, especially after a day's work in the Coroner's Court, but had found the lecture most interesting. Dr. Derrick had put an enormous amount of work into it and had compressed very interesting matter for thought into a small volume. Mr. Leahy did not venture to offer any opinion, but considered that Dr. Derrick's work would have some constructive results. This should confer a benefit on the community.

MR. J. D. O'HAGON, Under-Secretary for Justice, thanked Dr. Derrick for his invitation and for his paper, in which Mr. O'Hagon was very interested. Dr. Derrick had made a

careful analysis of the subject and had given food for thought. A very definite influence for good in London was the anti-suicide club, formed by the Salvation Army. Religion was a great consolation; no one could determine when he would end his life. Mr. O'Hagon thanked Dr. Derrick for suggestions. He wondered if there were cycles in suicide; he considered that the newspapers caused a lot of trouble by publishing the sordid details of the coroner's court. In London it was considered better not to publish these details.

MR. M. J. HICKEY, deputy coroner for the city of Brisbane, said he thought Mr. Leahy should have given more details from his interesting work. Mr. Hickey considered that most people contemplating suicide did not tell anyone; quite possibly a little more kindliness might help everyone. The Saint Vincent de Paul Society did such work among the poor. Mr. Hickey thanked Dr. Derrick for his invitation and had enjoyed the paper.

Dr. Derrick, in reply, said he realized his impertinence in tackling this subject from the psychological side, and he thanked the psychologists present for letting him off so lightly. His excuse was that he examined a suicide about every ten days, and saw an opportunity for prevention. He was glad to learn from Colonel Stafford that the machinery existed for prevention, and hoped that it would soon be put into action.

In reply to Dr. Streeter, Dr. Derrick said that the figures in Table V for money, sex, alcohol were gross underestimates of the importance of those factors. They comprised only the cases in which these factors were obvious to the policeman.

Dr. Derrick agreed with Dr. Thelander that inoperable carcinoma and advanced organic disease offered little scope for prevention. To what extent the psychotic group could be prevented had to be left to the psychiatrist to say. With regard to the right of a person to choose to end his life, many who had escaped their own burdens by suicide had thereby greatly increased the burdens of their wives and families. Suicides decreased at times of prosperity and increased at times of general depression.

He was convinced that a religious faith as the central idea of a personality was of the greatest value. When one had seen a drunken down-and-out "catch religion" and build himself up, conquering his difficulties one by one, until he became a victorious personality, one could not doubt that religion paid dividends in this life. With regard to the Roman attitude to suicide, Epictetus said that there were many exits from the theatre of life, and advised whoever disliked the show to retire from it by the nearest door of escape and make room for spectators of a more modest and grateful spirit.

To Dr. Phyllis Cilento Dr. Derrick replied that prevention in youth was infinitely better than treatment in adult clinics. But while there were hospitals to treat the physically diseased, there was also need for clinics to treat the mentally unhealthy.

In confirmation of Dr. Hirschfeld's mention of loneliness and exile as causes, Dr. Minogue in New South Wales found that suicide was relatively commoner in the immigrant than in the native born. Dr. Hirschfeld's practical suggestion of the need of a word of cheer to the burdened went home to him. One of his series was an acquaintance of his own. He had recognized his unhappiness, yet he had never set out to offer him the friendship and encouragement that might have saved him.

Mr. O'Hagon's mention of the good work of the Salvation Army in London and Mr. Hickey's mention of the difficulty in getting hold of potential suicides reminded him of a railway crossing near Kobe in Japan where suicides were prevalent. A Japanese woman who had become a Christian put up a notice at the crossing: "Wait a moment, God is love", together with her name and address. In sixteen years she saved 2,800 would-be suicides.

Dr. Derrick felt that there was scope in Brisbane for a number of psychological clinics, perhaps sponsored by the churches or other organizations, as well as a central clinic controlled by the director of psychiatry.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 96, of May 15, 1941.

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Reserve.

Promotion. — Surgeon Lieutenant-Commander Eustace Alwynne Rowlands is promoted to the rank of Surgeon Commander, dated 22nd April, 1941.

AUSTRALIAN MILITARY FORCES.

AUSTRALIAN ARMY MEDICAL CORPS.

Northern Command.

First Military District.

Honorary Captain G. M. S. May is appointed from the Reserve of Officers (A.A.M.C.) and to be Captain (provisionally), with regimental seniority next after Captain N. Geaney, 4th August, 1940 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 232/1940, promulgated in *Commonwealth Gazette* No. 258 of 1940).

Reserve of Officers.—To be Honorary Captains—James Campbell Moffatt and Harry Gilmore Wilson, 26th March, 1941, and 2nd April, 1941, respectively.

Eastern Command.

Second Military District.

Honorary Captain C. G. McDonald and Captain C. O. Donovan are appointed from the Reserve of Officers (A.A.M.C.), and to be Captains (provisionally), 30th June, 1940, and 9th December, 1940, respectively; the name William Clover Howie Epps, which appeared in Executive Minute No. 3/1941, promulgated in *Commonwealth Gazette* No. 7 of 1941, is amended to read William Glover Howie Epps. *To be Captains (provisionally)*—Francis Alexander Morrison and Desmond William Holme Arnott, 6th March, 1940, and 27th March, 1941, respectively.

Reserve of Officers.—To be Honorary Majors—Captains H. G. Humphries, H. S. Kirkland, W. R. Page, W. I. T. Hotten, B. B. Blomfield, A. T. H. Nisbet, E. W. Frecker, A. H. Baldwin, Honorary Captains J. W. Van R. Hoets, N. D. Royle, H. M. Rennie, L. Utz, F. S. Hansman and S. S. Roseberry, 29th March, 1941. *To be Honorary Captains*—Albert Hughie Hart, Thomas Barry, 19th March, 1941; Leslie William Tunley, Warnford Moppett, 21st March, 1941; Roy William Thompson, 22nd March, 1941; Sidney Ernest Smith, 24th March, 1941; Naaman George Malouf, 25th March, 1941; Ralph Douglas Kenneth Reye, 26th March, 1941; Richard Bartley Lynch, John Lewis Ratner, 27th March, 1941; Alexander Morven Dan, Gordon Leslie Gulson, 29th March, 1941; and Doris Adeline Selby, 4th April, 1941.

Southern Command.

Third Military District.

Honorary Captain C. T. Stephen is appointed from the Reserve of Officers (A.A.M.C.), and to be Captain (provisionally), 1st January, 1941; Captain V. C. Brown, M.C., is appointed from the Reserve of Officers, 1st March, 1941.

Reserve of Officers.—To be Honorary Captains—Marion Boyd Wanliss, Alton Stanley Jackson, Edward George Whiteford, Ernest Henry Strugnell Mancy, Harold Hamilton McLennan, George Leonard Lindon, Rae William Dungan, 25th March, 1941; Oliver Keith Hartridge, 27th March, 1941; John Edwin Digby Crozier, 1st April, 1941; and Alan Hamilton Millikan, 4th April, 1941.

Fourth Military District.

Reserve of Officers.—To be Honorary Captains—John Salts, 12th February, 1941; Neil Oldfield, 27th February, 1941; Hubert Garth Davis, 13th March, 1941; Thomas Dixie Finey, 19th March, 1941; Cedric Norman Clapp and Kenneth David Krantz, 25th March, 1941.

Sixth Military District.

Honorary Captain G. T. H. Harris is appointed from the Reserve of Officers (A.A.M.C.), and to be Captain (provisionally), 1st February, 1941.

Western Command.

Fifth Military District.

Captains K. C. Godfrey, J. A. Love and K. G. M. Aberdeen are appointed from the Reserve of Officers (A.A.M.C.), 14th January, 1941; Honorary Captain C. E. Cook is appointed from the Reserve of Officers (A.A.M.C.), to be Captain (provisionally) and Major (temporarily), 25th October, 1940 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 232/1940, promulgated in *Commonwealth Gazette* No. 258 of 1940). *To be Majors (temporarily)*—Captains W. J. Pannell, W. Muir, W. H. Godby, K. C. Godfrey and K. G. M. Aberdeen, 14th January, 1941.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

Temporary Squadron Leader N. H. Andrews is granted the rank of Temporary Wing Commander, with effect from 1st April, 1941.

Citizen Air Force: Medical Branch.

The following is granted a commission on probation with the rank of Flight Lieutenant, with effect from 21st April, 1941: Joseph Anthony Horan, M.B., B.S.

Flight Lieutenant J. S. Baird is transferred from the Reserve to the Active List and is granted the acting rank of Squadron Leader with effect from 18th April, 1941.

Flight Lieutenant K. F. D. Sweetman is transferred from the Reserve to the Active List, with effect from 21st April, 1941.

Squadron Leader R. B. Davis is granted the acting rank of Wing Commander with effect from 1st April, 1941.

The probationary appointments of the following Pilot Officers are confirmed, and they are promoted to the rank of Flying Officer with effect from the dates indicated: J. P. Esslemont, C. O. Duffy, H. J. R. Gamble, 5th February, 1941; A. V. Coleman, D. P. Felton, J. S. McNamara, 12th February, 1941; H. A. Murray, A. Hudson-Butler, 1st March, 1941; and A. A. Roper, 30th March, 1941.—(Ex. Min. No. 70. Approved 14th May, 1941.)

Reserve: Medical Branch.

The following are granted commissions on probation with the rank of Flight Lieutenant, with effect from dates indicated: Frank Robertson Vincent, M.B., B.S., 8th April, 1941, and Thomas Boyd Law, M.B., Ch.M., D.O.M.S., F.R.A.C.S., 24th April, 1941.—(Ex. Min. No. 66—Approved 14th May, 1941.)

The following are granted commissions on probation with the rank of Flight Lieutenant, with effect from 24th March, 1941: Arthur Ewins Dickmann, M.B., B.S., and John Leslie Roberts, M.B., Ch.M.—(Ex. Min. No. 67—Approved 14th May, 1941.)

CASUALTIES.

ACCORDING to the casualty list received on May 21, 1941, Major R. T. Binns, A.A.M.C., of Linden Park Gardens, South Australia, who was previously reported missing, is now reported to be a prisoner of war. Captain G. Gilbert, A.A.M.C., of Kensington, South Australia, who was previously reported missing, is now reported to be a prisoner of war.

Correspondence.

A BLOOD TRANSFUSION ACCIDENT.

SIR: Last week, in one of our district hospitals, I operated upon a patient for a gunshot wound of the abdomen. On account of the lack of a resident medical officer it fell to my lot to give the necessary transfusion, using the hospital's Stokes apparatus. While taking the blood from the donor I kept one hand on her arm, and the nurse aided the extraction of the blood by using the reversed Higginson's syringe. Five hundred cubic centimetres of blood had been successfully removed and the patient's condition was good. Suddenly I felt air pass up the patient's arm, she complained of feeling ill, with a pain in the chest, she looked as though about to die, lapsed into unconsciousness, and her pulse became impalpable. I removed the needle from her vein, passed it across the table to the nurse, asking her to place it in the citrate solution, which was in a glass bowl. Air bubbled through the solution for a very short time, but after a few more squeezes of the Higginson bulb the citrate solution was sucked up. Fortunately the patient recovered in a few minutes and complained of a headache and a pain in the left side of the chest, worse on taking a deep breath.

Those who have used a Higgingson's syringe for irrigations will no doubt have noticed not infrequently that the needle valve sticks a little at times and the syringe works both ways.

A word is sufficient to the wise.

Yours, etc.,

V. J. KINSELLA.

235, Macquarie Street,
Sydney,
May 9, 1941.

CONTINUOUS SPINAL ANÆSTHESIA.

SIR: Continuous spinal anæsthesia has been given for abdominal operations at the Balaklava Hospital, using the method described in the January *Annals of Surgery*, 1940, by Dr. Lemmon.

The anæsthetic used was "Novocain" sterilized in three cubic centimetres of water and mixed with six cubic centimetres of cerebro-spinal fluid. This averages a specific gravity of 1·004 and is slightly lighter than most spinal fluids, so that the Trendelenburg position is adopted shortly after injection.

The anæsthetic has proved eminently satisfactory in each case, repeated injections quickly dispelling oncoming rigidity or discomfort; the longest anæsthetic was three hours.

There have been no after-effects nor untoward symptoms from the anæsthetic; on the contrary the knowledge that the anæsthetic can be prolonged gives a confidence, often missing in spinal anæsthesia by other means, where it may be a race between finishing the operation and the wearing away of the anæsthetic.

It is necessary to have a special cushion for the table top.[1]

Yours, etc.,

E. A. JOSKE.

Balaklava,
South Australia,
May 9, 1941.

AUSTRALIAN DOCTORS AND THE WAR.

SIR: Your leading article of May 3—"Australian Doctors and the War"—brings enlightenment to most of us who want to pull our weight in the war effort and to do it now. But the appeal from the Old Country for medical help in Britain and in India is a haunting appeal that cannot be set aside by a flat refusal based on statistics. Early in 1915 Britain asked Australia for 100 doctors for her new army—"Kitchener's Army" as it was called. The hundred responded at once. Of the forty of us who went from Sydney, the majority had only graduated the month before. On May 12 twenty-six years ago we reached London. We sacrificed our year of hospital residence and most of us sacrificed four years of our career. A few, of course, gave far more. As regards our services as medical officers, I think that they were satisfactory for the purposes for which they were required. Speaking personally, of my three years with the Royal Army Medical Corps the major part was spent as a regimental medical officer in France, an experience which brought me no regrets, but only pride and confidence in my work and a love and understanding of the British soldier that will never grow dim, and this in spite of a medical training which from a peace-time point of view was incomplete. During periods of duty in hospitals I was able to act as anæsthetist and assistant from the first. Opportunities came thick and fast in those days, and under the friendly guidance of senior men one was soon able to deal with the lighter surgical cases. (Nevertheless, to digress still further, there should be much more attention given to war surgery in Australia at the present time, especially amongst final-year students.) To return to the present call, I believe that the response will come if the authorities will act. It only needs the right appeal. I do not believe that the young medical men of today have lost the spirit which puts service before career. The emphasis seems to be put by the authorities too much on the needs of a reserve, too little on the needs of the front line. It is confinement to a dug-out that "maketh the spirit wax exceeding weak". To enter the din of battle only serves to steel the resolution.

If Britain needs medical men and India needs medical men, let us not refuse some response, even if it is only a batch of a dozen or two that can be spared. If the authorities will show the way, I feel sure that the volunteers will be forthcoming. Amongst the statistics in your leading article it is computed that 180 will be needed as reinforcements for the Australian Army, Navy and Air Force by the end of this year, and that 1,260 are needed to be held in reserve in case of mobilization in Australia. But against this, on the credit side, we have the possibility that mobilization in Australia will never be required, and also that at the end of this year some 200 to 300 graduates should be turned out from our universities.

I hope, therefore, that the authorities will not consider this matter finalized and will not give a refusal to the British Government. Many of the younger men would volunteer for India and many of the older men for work in Britain with the Emergency Medical Services if only the authorities will say the word and will lay open the avenue

[1] Made by Brown and Pearce, Adelaide.

of approach. What a privilege and what an opportunity for those who can go! The State Medical Coordination Committee of Queensland has informed me that as far as they know there is no organization in Australia to which a volunteer can apply. Will the Central Medical Coordination Committee therefore consider forming such an organization? The appeal is there. Better to allow a handful to go than to send a refusal.

Yours, etc.,
C. R. R. HUXTABLE.

Southport,
Queensland,
May 14, 1941.

[The following information is supplied by the Secretary of the Central Medical Coordination Committee. (*a*) There is a lack of younger medical men as volunteers; 280 are required this year. The numbers who have volunteered up to the present fall far short of this total. (*b*) The Central Medical Coordination Committee will reconsider the question of sending medical men to England and India if the numbers who have volunteered are in excess of Australian requirements. (*c*) Young men who volunteer will not be retained as a reserve in Australia to meet the demand for doctors which will arise if mobilization is ordered. They will be used forthwith in the services. (*d*) The Central Medical Coordination Committee is instituting an active campaign in every State of the Commonwealth. Each volunteer should interview the deputy-chairman of the medical coordination committee in his State to obtain full information.—EDITOR.]

AN UNUSUAL CAUSE OF DEATH.

SIR: In THE MEDICAL JOURNAL OF AUSTRALIA, May 10, 1941, there is the report of "An Unusual Cause of Death". Your contributor remarks that, "This history is new to me", *et cetera*. I think a similar type of case occurred at the Melbourne Hospital in the late "teens" of this century. Colin Macdonald, of Melbourne, would remember this case.

A man was admitted with an electric light bulb in his lower bowel. He gave a similar history to Dr. Holcombe's case in that he was using the bulb to push back a pile. The bulb was of the straight-sided type, and was inserted adaptor end first. Apparently everything went all right up to the maximum width, then the sphincters took charge and the bulb was gone.

If I remember rightly, two main points arose in connexion with its removal: (i) What would happen if his sphincters were split to aid removal? (ii) What would happen if the bulb exploded during removal?

I think after discussion the sphincters were split and loops of wire were passed so as to make a kind of net (like a seltzogene bottle), and the whole withdrawn by pulling on the wires.

I hope after twenty odd years that my memory is not playing me false about this. But the similarity in the reasons for using a tennis ball and an electric light bulb to push back a pile seems to make it worth while drawing even on memory.

Yours, etc.,
C. E. S. JACKSON.

Townsville,
Queensland,
May 14, 1941.

REPORT OF PARLIAMENTARY COMMITTEE ON HOSPITALS OF NEW SOUTH WALES.

SIR: I have read with considerable interest the report of the Commission on Hospitals in New South Wales. I am in complete agreement with their conclusions as to the necessity for alterations in the curriculum of the first year of the medical course as at present constituted.

Early in the Great War, 1914-1918, the University of Melbourne, in their wisdom, decided to admit direct to second year such students who had obtained honours in physics and chemistry at their final examination from school or college. This meant an exemption from natural philosophy part I and chemistry part I. The third subject in the normal first year—zoology—was studied with the subjects of the second year.

In March, 1916, this privilege was availed of by some ten students. The course was completed by these men in November, 1919, three of whom secured places in the first five of final honour candidates. After a term as hospital residents to conform with the regulations of the General Medical Council, degrees were conferred in May, 1920.

It is interesting, over twenty years after the graduation of this body of students, to consider just exactly what effect such a short period of university training has had on their present status in the profession. Perhaps the hospital appointments held may provide some indication. These include: (*a*) surgeon to in-patients, (*b*) physician to in-patients, (*c*) surgeon to the urological clinic, (*d*) acting gynæcologist to in-patients (all these being in clinical schools in Melbourne), (*e*) surgeon to the Brisbane Hospital, and (*f*) director of pathology, Department of Public Health, Queensland.

The list of higher degrees obtained since graduation by these six men is imposing: M.D. (Melbourne), 5; M.S. (Melbourne), 1; F.R.C.S. (England), 3; F.R.C.S. (Edinburgh), 1; M.R.C.P. (England), 1.

Six swallows certainly do not make a spring, but facts such as these confirm the findings of the commission referred to and give rise to querulous thinking as to whether the first year as now constituted could not and should not be completed prior to the entrance of the student to the university.

Yours, etc.,
"ONE OF THEM."

Melbourne,
Victoria,
May 15, 1941.

A CASE OF TUBERCULOSIS AND CANCER.

SIR: Moved by the able and elaborate inquiry by Dr. Thomas Cherry of the possible relation of tuberculosis and cancer, I reported a case (*vide* THE MEDICAL JOURNAL OF AUSTRALIA, April 19, 1941). Dr. A. J. Fitzgerald (THE MEDICAL JOURNAL OF AUSTRALIA, May 17, 1941) kindly says it is of peculiar interest. I am duly grateful. Nonetheless I cannot agree that his dissertation on allergy affords "the complete answer" nor that there is "a common basis [other, of course, than mankind itself] for most of the maladies afflicting mankind". In the journal of December 31, 1921, is recorded the case of a lady who at the same time suffered from pulmonary tuberculosis, gastric ulcer, tapeworm, uterine retroversion and a typhoidal fever!

Yours, etc.,
GUY GRIFFITHS.

131, Macquarie Street,
Sydney,
May 21, 1941.

BRITISH MEDICAL ASSOCIATION ASSISTANCE TO MEMBERS ON MILITARY SERVICE, BRISBANE.

SIR: Dr. Culpin's letter *re* the above scheme, published in your issue of May 17, calls for a reply.

At the meeting mentioned by Dr. Culpin, he proposed that the trustees should call contributions to the limit and form a fund to assist men on their return and also assist members of the profession in the United Kingdom. Most of the complaints that have come under the notice of the trustees have been that the contributions at present are too high. However, the meeting in November approved of the action of the trustees and instructed them to carry on in the manner they had been following.

Following the receipt of an anonymous letter and other verbal complaints, a meeting of the members was called for Friday, May 16; of the 130 members who might have attended, 30 turned up. It was evident from the discussion that some change in the allotment would probably become necessary, and a motion that the method of distribution be revised was passed by 16 to 4. After further discussion a motion was unanimously passed that this meeting does not desire immediate revision of payments to beneficiaries. These facts surely do not bear out Dr. Culpin's statements.

Yours, etc.,
ALEX H. MARKS.

109, Wickham Terrace,
Brisbane.
(Undated.)

Obituary.

NORMAN JOSIAH SOLOMON.

WE regret to announce the death of Dr. Norman Josiah Solomon, which occurred on May 23, 1941, at Wagga, New South Wales.

MEDICAL WAR RELIEF FUND.

THE following is a fifth list of contributions to the Medical War Relief Fund established by the Federal Council of the British Medical Association in Australia for the relief of distressed medical practitioners in Great Britain.

Western Australia.

£5 5s.: Dr. A. B. Webster, Dr. E. R. Beech.

£1 1s.: Dr. E. C. L. Ryan, Dr. A. Einihovici, Dr. G. L. Myles, Dr. G. Mayrhofer, Dr. F. S. Butler.

Victoria.

Amounts Collected and Remitted to London.

£52 10s.: Victorian Medical Benevolent Association.

£25: Dr. R. H. Fetherston.

£25: British Medical Insurance Company of Victoria, Limited.

Further Contributions.

£100: Dr. Marion B. Wanliss.

£26 5s.: Dr. Konrad Hiller.

£25: Dr. E. W. Sutcliffe, the Medical Society of Victoria.

£21: Dr. Fay Maclure.

£10 10s.: Sir James Barrett, Dr. R. Brodie, Dr. A. E. Brown, Dr. Arthur J. Day, Dr. Winifred Kennan, Dr. J. L. Kneebone, Dr. M. D. Silberberg, Dr. R. Ramsay Webb.

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£5: Dr. R. D. Bartram, Dr. H. O. Cowen, Dr. W. R. Groves, Dr. E. F. Langley, Dr. J. E. Nihill, Dr. R. A. Parker, Dr. Kenneth Smith, Dr. F. L. Trinca, Dr. Minnie Varley.

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£3 3s.: Dr. R. Scott Good, Dr. J. S. Ormond, Dr. R. Stott, Dr. A. G. R. Uglow, Dr. R. A. Willis, Dr. D. Wise.

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£2: Dr. P. G. Dane, Dr. A. J. M. Nelson.

£1 1s.: Dr. W. Begg, Dr. C. E. Crooke, Dr. W. Davis, Dr. C. E. Dennis, Dr. C. H. Fitts, Dr. E. Fox, Dr. Gladys Hallows, Dr. G. R. Killmier, Dr. D. G. Renton, Lieutenant-Colonel L. M. Routh, Dr. D. Zacharin.

South Australia.

£5 5s.: Dr. A. B. Russell, Dr. H. W. S. Laurie.

£3 3s.: Dr. R. D. Hornabrook.

Notice.

THE next meeting of the clinical section of the medical board of the Royal Prince Alfred Hospital will be held on Monday, June 9, 1941, in the A2 lecture theatre at 4.30 o'clock p.m. The meeting will last for approximately one hour and will consist of a demonstration by Dr. C. L. Chapman and Dr. J. W. S. Laidley. All medical practitioners are invited to be present.

Nominations and Elections.

THE undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Pryor, William Arthur, M.B., B.S., 1919 (Univ. Adelaide), 125, Victoria Street, Ballarat.

Books Received.

"Experimental Physiology for Medical Students", by D. T. Harris, M.D., D.Sc., F.Inst.P.; Third Edition; 1941. London: J. and A. Churchill Limited. Medium 8vo, pp. 303, with 248 illustrations and plate in colour. Price: 15s. net.

Diary for the Month.

JUNE 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JUNE 4.—Victorian Branch, B.M.A.: Branch.
JUNE 4.—Western Australian Branch, B.M.A.: Council.
JUNE 5.—South Australian Branch, B.M.A.: Council.
JUNE 6.—Queensland Branch, B.M.A.: Branch—Joseph Bancroft Memorial Lecture.
JUNE 6.—Victorian Branch, B.M.A.: Legislation Subcommittee.
JUNE 10.—Tasmanian Branch, B.M.A.: Branch.
JUNE 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 12.—Victorian Branch, B.M.A.: Ethics Subcommittee.
JUNE 13.—Queensland Branch, B.M.A.: Council.
JUNE 16.—Victorian Branch, B.M.A.: Hospital Subcommittee.
JUNE 17.—Victorian Branch, B.M.A.: Organization Subcommittee.
JUNE 17.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
JUNE 17.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 18.—Western Australian Branch, B.M.A.: Branch.
JUNE 19.—New South Wales Branch, B.M.A.: Clinical.
JUNE 19.—Victorian Branch, B.M.A.: Executive.
JUNE 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JUNE 25.—Victorian Branch, B.M.A.: Council.
JUNE 26.—New South Wales Branch, B.M.A.: Branch.
JUNE 26.—South Australian Branch, B.M.A.: Branch.
JUNE 27.—Queensland Branch, B.M.A.: Council.
JUNE 27.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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